

JUVENILE PERIODONTITIS: PREVALENCE AND CLINICAL FINDINGS  
IN A YOUNG MILITARY POPULATION

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JUVENILE PERIODONTITIS: PREVALENCE AND CLINICAL FINDINGS  
IN A YOUNG MILITARY POPULATION

A  
THESIS

Presented to the Faculty of  
The University of Texas Graduate School of Biomedical Sciences  
At San Antonio  
in Partial Fulfillment  
of the Requirements  
for the Degree of  
MASTER OF SCIENCE

By  
Robert Bousquet, A.A., D.M.D.

San Antonio, Texas

June 1985

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JUVENILE PERIODONTITIS: PREVALENCE AND CLINICAL FINDINGS  
IN A YOUNG MILITARY POPULATION

Robert Bousquet

APPROVED:

Thomas Walby  
Supervising Professor

Donald E. Cummings  
Elw. A. A. A.

James J. Lane  
Chief Practitioner



27 June 1986  
Date

APPROVED:

A. J. Guarino  
A. J. Guarino, Ph.D.  
Dean

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## DEDICATION

I dedicate this Thesis to my wife, Sandra, and daughter, Jennifer, who have so graciously (most of the time) given up their family life so that this Thesis might be completed.

I have yet to find the man, however exalted his station, who did not do better work and put forth greater effort under a spirit of approval than under a spirit of criticism.

Charles Schwab

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JUVENILE PERIODONTITIS: PREVALENCE AND CLINICAL  
FINDINGS IN A YOUNG MILITARY POPULATION

Robert Bousquet, M.S.

The University of Texas Graduate School of Biomedical Sciences  
at San Antonio

Supervising Professor: Thomas C. Waldrop

→ The purpose of this study was twofold. One, to determine the prevalence, geographic distribution, sex ratio and racial distribution of juvenile periodontitis in a young, U.S. military population. And two, to document the clinical characteristics of juvenile periodontitis in these patients.

The panoramic radiographs of 16,658 U.S. Air Force basic trainees were screened for alveolar bone loss.

Forty-four patients were identified as having juvenile →

periodontitis. Of these, 36 were available for clinical examination. Patients were clinically evaluated for gingival inflammation (GI), plaque (PII), calculus (CI), probing depths, bleeding upon probing, mobility and balancing interferences. A dental history, medical history and clinical laboratory procedures including fasting blood glucose, Antinuclear Antibody and CBC with differential were accomplished. The patients' age, sex, race and geographical area of enlistment were documented. A full mouth series of radiographs were taken and interpreted for type of bone loss, amount of bone loss (Schei technique), evidence of furcation invasion, and calculus.

Patients were divided into groups based upon the location and number of affected teeth. These groups were defined as: localized juvenile periodontitis (first molar and incisor only), intermediate juvenile periodontitis (< 14 teeth) and generalized juvenile periodontitis ( $\geq$  14 teeth).

The overall prevalence of juvenile periodontitis was .26%. The prevalence of localized juvenile periodontitis was .03%, for intermediate juvenile periodontitis .08% and for generalized juvenile periodontitis .15%. There was no difference in the prevalence of juvenile periodontitis between 7 geographic areas of the United States.

There was a female to male prevalence ratio of 2.32/1, a Black to Caucasian prevalence ratio of 16.13/1, a Black male

to Caucasian male prevalence ratio of 20.67/1 and a Black female to Caucasian female ratio of 6.68/1. No significant difference was found between the Black female to Black male prevalence ratio or Caucasian female to Caucasian male prevalence ratio.

The most frequently and severely affected teeth were maxillary and mandibular first molars, followed by incisors. The least frequently involved and the less severely affected teeth were the cuspids. There was no difference in the extent of bone loss between maxillary and mandibular arches. Fifty percent of the patients showed symmetry or mirror image type bone loss when right and left sides of the mouth were compared. Both the percentage of teeth affected and the percentage of the population affected increased with age. There was twice as much bone loss on affected teeth in patients with generalized juvenile periodontitis patients compared to patients with intermediate juvenile periodontitis. The majority of the patients exhibited horizontal type bone loss. However, the percentage of angular bone loss was higher in the intermediate juvenile periodontitis cases than in the patients with generalized juvenile periodontitis.

The affected teeth in both the intermediate and generalized juvenile periodontitis groups demonstrated more plaque, inflammation and bleeding on probing than unaffected teeth. Furcation invasion was noted radiographically on 20%



of affected molars. No mobility was found on 91.5% of the affected teeth. Only 1.7% of the teeth in this study demonstrated balancing interferences.

This study discounts the hypothesis that there is a geographic difference in the prevalence of juvenile periodontitis within the United States. It also discounts the hypothesis that occlusal traumatism is a primary etiologic factor in juvenile periodontitis.

This study supports the concepts that juvenile periodontitis is more prevalent in Blacks than Caucasians and that it is more prevalent in females than males. It also supports the concept that first molars are the most frequently and severely affected teeth in juvenile periodontitis and that involvement may start as localized molar-incisor involvement and proceed to involve additional teeth with time. It also supports the hypothesis that plaque, inflammation and bleeding on probing are associated with juvenile periodontitis lesions.

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## I. INTRODUCTION

"Juvenile Periodontitis" (Periodontosis) has been classically defined as: "A disease of the periodontium occurring in an otherwise healthy adolescent, which is characterized by a rapid loss of the alveolar bone about more than one tooth of the permanent dentition. The amount of destruction manifested is not commensurate with the amounts of local irritants present." (Baer, 1971)

Estimates of the prevalence of juvenile periodontitis vary from 0 to 17.6%. (Barnett et al., 1982; Blankenstein et al., 1978; Dawson, 1948; Marshall-Day and Shourie, 1949; Marshall-Day et al., 1955; Emslie, 1966; Kaslick and Chasens, 1968; Lacy and Brasher, 1977; Loe et al., 1978; MacGregor, 1977; Ramfjord, 1961; Rao, 1968; Russell, 1971; Saxen, 1980) The variance in prevalence between studies is due to the difference in populations sampled and screening methods used. Today juvenile periodontitis refers to a distinct disease entity occurring after puberty and characterized by bone loss involving primarily the first molars and incisors. Baer (1971) originally described two expressions of the disease, a localized form involving first molars and incisors and a generalized form involving the entire dentition. Based on recent bacteriological and immunologic studies, generalized disease in adolescents has been hypothesized to be a distinct disease entity separate from localized disease. (Slots, 1976,

Newman, 1981; Ranney et al., 1981) Page and Schroeder (1982) have defined generalized disease in adolescents and young adults as "Rapidly Progressive Periodontitis," the prevalence of which has not been reported. However, it has also been reported that there is increased tooth involvement with age. (Hormand and Frandsen, 1979; Ranney, 1981b; Fine, 1984; Burmeister, 1984; Saxen and Murtomaa, 1985) On the basis of this evidence, it has been hypothesized that juvenile periodontitis begins as localized first molar-incisor involvement and progresses to generalized involvement with age.

The overall female to male ratio for juvenile periodontitis has been reported to be 2:1. (Barnett et al., 1982; Marshall-Day and Shourie, 1949; Emslie, 1966; Saxen, 1980; Melnick et al., 1976) When race has been considered, the Black population has been shown to have an overall higher prevalence than Caucasians. (Hew et al., 1979) It has also been suggested that juvenile periodontitis may be more common in the southwestern United States. (Kaslick and Chasens, 1968; Lacy and Brasher, 1977) The female to male ratio, racial prevalence and geographic distribution of generalized disease have not been determined.

United States Air Force military recruits between the age of 18-27 represent a cross-section of young adults from the United States. The purpose of this study was to screen this population and answer the following questions:



1. What is the prevalence of juvenile periodontitis in this group, using well defined clinical and radiographic parameters?
2. What is the female to male ratio of juvenile periodontitis?
3. What is the geographic prevalence of juvenile periodontitis?
4. What are the clinical findings in patients who are identified as having juvenile periodontitis?
5. Does tooth involvement (quantity and severity) increase with age in patients with juvenile periodontitis?
6. Does localized and generalized juvenile periodontitis appear to be distinct diseases or a progression of the same disease?

## II. LITERATURE REVIEW

### A. Nomenclature

Various terms have been used to describe alveolar bone loss in adolescents and young adults. This entity was first introduced in 1923 by Gottlieb as "Diffuse Atrophy of Alveolar Bone." He described a case of severe alveolar bone loss in a 22-year-old man in which a loss in functional arrangement of the periodontal ligament was present without signs of gingival inflammation. Gottlieb (1928) later introduced the term "Deep Cementopathia" and suggested that the cause of the disorder was due to a defect in cementum formation.

Gottlieb's concept of cementopathia was challenged by Wannenmacher in 1938, when he introduced the term "Paradontitis Marginalis Progressiva." This was the first report to suggest that the bone loss occurred primarily in the first molar and incisor areas and to associate clinical signs of inflammation with the bone loss.

In 1940, Thoma and Goldman introduced the term "Paradontosis." These authors felt that the first signs of the disease were migration and loosening of the maxillary incisors, occurring primarily during the early and middle periods of life. Miller et al. (1941) subsequently reported on 35 cases of the disease in young individuals ranging in age from 14-30 years and introduced the term "Precocious Advanced

Alveolar Bone Destruction." Orban and Weinmann, in 1942, concluded that the disease was degenerative rather than inflammatory in nature and proposed that it be called "Periodontosis." Butler (1969) felt that the term "Juvenile Periodontitis" was more descriptive. He thought the pattern of bone loss observed was a result of inflammation and not the result of a degenerative process. In addition to the latter terms, other terms that have been used to describe this entity include: "Acute Juvenile Periodontitis" (Chaput, 1967), "Periodontosis with Periodontitis" (Kaslick and Chasens, 1968), "Localized Generalized Periodontosis" (Baer, 1971), "Periodontitis Complex" (Box, 1972), "Localized Periodontosis" (Fourel, 1972), "Gottlieb Syndrome" (Fourel, 1974), "Precocious Periodontitis" (Sugarman and Sugarman, 1977), "Destructive Juvenile Periodontitis" (Waerhaug, 1977), and "Localized Juvenile Periodontitis" (Manouchehr-Pour and Bissada, 1979).

In the literature of the 1970's the terms juvenile periodontitis and periodontosis were being used interchangeably. Baer and Kaslick (1978) argued for the term "Periodontosis," stating that it did not mean a degenerative condition, but only an abnormal or diseased condition of the periodontium. A case for using the term "Juvenile Periodontitis" was made by Manson and Lehner (1974). The authors felt that the disease was not degenerative in nature, and felt that the term "Juvenile Periodontitis" emphasized an

inflammatory disease process confined to young people that was different from adult type periodontitis. The term "Juvenile Periodontitis" was also preferred by Waerhaug (1976, 1977), who observed that root surfaces of extracted, affected teeth from young individuals with this disease always exhibited a thin layer of microbial plaque. In 1977, Sugarman and Sugarman recommended that the term "Periodontosis" be dropped from use. Today, the most commonly used terms to describe this entity are "Juvenile Periodontitis" and "Localized Juvenile Periodontitis." (Waldrop, 1984) For the purposes of this study, the term "Juvenile Periodontitis" will be used.

#### B. Definition

Early investigators (Gottlieb, 1923, 1928; Orban and Weinmann, 1942) considered juvenile periodontitis to be a degenerative disease process. Wannemacher (1938) was the first to describe molar-incisor involvement and to associate inflammation with bone loss. He reported that, although the gingival tissues appeared clinically pink and healthy, bleeding on probing was present. Orban and Weinmann (1942) were the first to define the disease as occurring in young individuals 14-30 years of age.

The Nomenclature Committee of the American Academy of Periodontology (1950) defined "Periodontosis" (juvenile periodontitis) as a "degenerative non-inflammatory destruction of the periodontium originating in one or more of the

periodontal structures, characterized by migration and loosening of the teeth in the presence or absence of secondary epithelial proliferation and pocket formation or secondary gingival disease."

In their review of the literature, Yount and Belting (1956) described two stages of juvenile periodontitis. They felt stage one was degenerative, characterized by pocket formation, bone loss and gingiva that appeared normal, while stage two was inflammatory, associated with subgingival calculus formation. Prichard (1965) suggested that the early clinical signs of juvenile periodontitis (loosening and migration of teeth, angular bone loss and normal appearing gingiva) were the result of occlusal traumatism and that pocket formation could not occur without inflammation. Prichard suggested that "Periodontosis" (juvenile periodontitis) was not a degenerative disease. Later Baer (1971) classically defined "Periodontosis" (juvenile periodontitis) as "a disease of the periodontium occurring in an otherwise healthy adolescent, which is characterized by a rapid loss of alveolar bone about more than one tooth of the permanent dentition. There are two basic forms in which it occurs. In one form, the teeth affected are the incisors and the first molars; in the other, more generalized form, most of the dentition can be affected. The amount of destruction manifested is not commensurate with the amounts of local irritants."



Contrary to Baer's definition of "Periodontosis" (juvenile periodontitis), the presence of microbial plaque associated with juvenile periodontitis lesions has been well documented by numerous authors: (Waerhaug, 1976, 1977b; Allen and Brady, 1978; Newman et al., 1976, 1977; Listgarten, 1976; Slots, 1976, 1980). A chronic inflammatory infiltrate, consisting of predominantly plasma cells in the gingival tissues from juvenile periodontitis lesions, has also been shown. (Tenebaum, 1950; Liljenberg and Lindhe, 1980; Waldrop et al., 1981; Gillett and Johnson, 1982) In addition, juvenile periodontitis has been shown to respond to conventional therapy. (Waerhaug, 1977a; Hoge and Kirkham, 1981; Popper, 1981; Evian et al., 1982; Lindhe, 1982, 1984; Jaffin, 1984)

This evidence supports the concept that juvenile periodontitis is not a degenerative process. It also suggests that the etiology of juvenile periodontitis is, at least in part, a result of the presence of microbial plaque and inflammatory in nature. Therefore, today juvenile periodontitis is best defined as an inflammatory disease of the periodontium, with onset at puberty, occurring in an otherwise systemically healthy adolescent or young adult, which is manifested clinically and radiographically by destructive disease about more than one tooth of the permanent dentition.

### C. Localized Versus Generalized

The term juvenile periodontitis has been used to describe localized and generalized forms of bone loss in young individuals. Wannemacher (1938) was the first to describe juvenile periodontitis as a disease confined to bone loss involving the permanent first molars and incisors. Fourel (1972) argued that molar-incisor bone loss represented the only true type of juvenile periodontitis. Baer (1971) described two forms of the disease.

The more generalized form of juvenile periodontitis has not been seen as frequently in adolescents as the localized form. Manson and Lehner (1974) examined 22 patients aged 15-22 years with bone loss and found only 2 cases of diffuse involvement. Horman and Frandsen (1979) reported that generalized involvement was not found in 12-18 year olds, but 35% of 26-32 year olds with bone loss had generalized involvement. They speculated that localized involvement preceded involvement of other teeth. Other authors have also suggested that localized involvement may progress to a more generalized form. (Saxen, 1980b; Burmeister et al., 1984; Saxen and Murtomaa, 1985) In addition, Vandestein et al. (1981) reported a case of a 23-year-old female who presented with generalized involvement, but radiographs from age 15 were presented which documented the presence of localized involvement prior to the presence of generalized involvement. In contrast, Page and Schroeder (1982) have documented

cases of generalized involvement which were not preceded by localized involvement.

A specific flora has been shown to be associated with localized lesions. Specifically, Actinobacillus actinomycetemcomitans has been demonstrated by Tanner et al. (1979); Zambon et al. (1982) and Savitt and Socransky (1984) and Capnocytophaga by Newman et al. (1976); Listgarten (1976) and Slots (1976). In addition, reports have demonstrated elevated serum antibody titers to Actinobacillus actinomycetemcomitans in patients with localized involvement. (Genco et al., 1980a; Murray and Genco, 1980; Morton et al., 1981 and Ebersole et al., 1980a, 1980b, 1982)

In contrast, patients with generalized involvement have not been shown to have elevated serum antibody titers to the flora specific for localized involvement. (Moore et al., 1982 and Vincent et al., 1983) Page and Schroeder (1982) and Waldrop (1984) have proposed that the terms "Juvenile Periodontitis" and/or "Localized Juvenile Periodontitis" be limited to those clinical cases with only first molar and/or incisor alveolar bone loss. For the purposes of this paper, the term localized juvenile periodontitis will be used to describe those cases with only first molar-incisor alveolar bone loss.

#### D. Generalized Disease

Generalized bone loss in young individuals has also been defined by a variety of terms. Baer (1971) called this form of the disease "Generalized Periodontosis."

Hormand and Frandsen (1979) defined the disease process based on patterns of bone loss as follows: Type I - First molar and incisor involvement only; Type II - First molar and/or incisor involvement and a few additionally involved teeth, but  $< 14$  teeth involved; Type III - Generalized involvement,  $\geq 14$  teeth involved. The authors thought the disease started as Type I and progressed to Type III with age. Van Dyke et al. (1980) used the term "Generalized Juvenile Periodontitis" to describe patients with severe alveolar bone loss involving  $> 14$  teeth with no clear pattern of localization of bone loss and younger than 30 years of age.

Ranney et al. (1981a, 1981b) called generalized disease in adolescents "Severe Periodontitis" and defined it as attachment loss  $\geq 5$  mm on 8 or more teeth with at least 3 not being first molars or incisors. Patients had to be less than 30 years of age and could have no known signs, symptoms or history of systemic disease. In addition, patients were characterized by having clinical signs of gingival inflammation. The authors felt that "Severe Periodontitis" could be synonymous with "Generalized Juvenile Periodontitis."

Harvey (1981a, 1981b) divided "Periodontosis" into 3 classes on the basis of which teeth were affected. He defined the classes as follows: Class I - Molar/incisor involvement; Class II - Molar/incisor and cuspid/first bicuspid involvement; Class III - Generalized involvement.

Recently, Page and Schroeder (1982) coined the phrase "Rapidly Progressive Periodontitis" to define rapid, generalized bone loss occurring at any age after puberty, but normally between 20-35 years of age. Patients had acutely inflamed gingiva and most had a neutrophil and/or monocyte defect. By definition, patients may or may not have had a history of "Localized Juvenile Periodontitis" and systemic diseases. Based on the above criteria, Page et al. (1983) reported on 7 cases of "Rapidly Progressive Periodontitis" in which 83% of the cases had a neutrophil and/or monocyte defect.

Burmeister et al. (1984) preferred the term "Severe Periodontitis" to describe patients with a "generalized pattern of severe destruction with attachment loss of at least 5 mm on 8 or more teeth, at least 3 of which are not first molar or incisors." Greenstein (1985), in his recent review article, used the definition of Page and Schroeder (1982) and the term "Rapidly Progressive Periodontitis" to describe generalized involvement in individuals between puberty and 30 years of age.

Based on current knowledge, it appears that a cross-sectional sampling of young individuals between the ages of puberty and 30 years of age would reveal two distinct patterns of bone loss; one being a localized first molar/incisor pattern and the other a generalized involvement  $\geq 14$  teeth. It also seems that an intermediate pattern involving more teeth than first molar/incisors but  $< 14$  teeth can be seen. Evidence from cross-sectional samples (Hormand and Frandsen, 1979 and Saxen and Murtomaa, 1985) seems to indicate that the localized form may progress to involve more teeth with increasing age. For the purposes of this study, generalized involvement  $\geq 14$  teeth will be referred to as generalized juvenile periodontitis. Intermediate juvenile periodontitis will be used to refer to that form of the disease involving more teeth than first molars and incisors, but less than 14 teeth. The term rapidly progressive periodontitis should be reserved for that group of patients with generalized alveolar bone loss who show no signs of previous localized juvenile periodontitis.

#### E. Prevalence

Estimates of the prevalence of juvenile periodontitis in young individuals have varied from 0-17.6% (Table 1). This difference in reported prevalence may reflect differences in (Waldrop, 1984):

##### 1. Criteria used for diagnosis.

TABLE 1

## PREVALENCE OF JUVENILE PERIODONTITIS

<u>STUDY</u>	<u>AGE</u>	<u>SIZE</u>	<u>LOCATION/ POPULATION</u>	<u>%</u>
Dawson (1948)	15-55	944	Egypt	5.6
Marshall-Day and Shourie (1949)	9-16	-	Bombay	17.6
Ramfjord (1961)	11-17	1,676	Bombay	0
Basu-Dutta (1962)	12-17	-	Calcutta	5
Miglani and Sharma (1965)	-	-	Madras	0.1
Emslie (1966)	5-20	300	Nigeria	5/300
	5-20	995	Sudan	3/995
Waerhaug (1967)	13-60	10,000	Ceylon	0
Kaslick and Chasens (1968)	16-26	3,896	Army Recruits	0.15
Rao and Tewani (1968)	15-25	1,200	Bombay	6.8
Glauser and Humphreys (1971)	-	2,050	Navajo Indians	14/2050
Lacy and Brasher (1977)	-	3,235	U.S. Military	0.4
Hew and Killoy (1979)	18-22	22,000	Air Force Recruits	0.25
Saxen (1980b)	16	8,096	Norwegian	0.1
Hoover et al. (1981)	15-16	2,813	Danish	0.1
Gjermo et al. (1984)	13-16	304	Brazil	3.7
Hansen et al. (1984)	15	2,409	Norwegian	0.5



2. Variation in diagnostic technique.
3. Age group examined.
4. Sex.
5. Geographic differences.
6. Socioeconomic group.
7. Indices used.
8. Primary versus permanent teeth.

Kaslick and Chasens (1968) randomly sampled (every other man) 7,646 Army recruits at Fort Polk, Louisiana. The authors used mobility as an initial screening test and reported a prevalence of 0.15%. The authors considered this figure to be low since their initial screening probably detected only advanced cases in which mobility was a clinical feature.

Lacy and Brasher (1978) examined 3,235 panoramic radiographs from Army recruits at Fort Dix, New Jersey, and clinically examined suspected cases to confirm their diagnosis. The authors reported a prevalence of 0.40%. Hew and Killoy (1979) examined 22,000 U.S. Air Force recruits at Lackland AFB, Texas, and reported an overall prevalence of 0.255%. In summation, the prevalence of juvenile periodontitis in U.S. Military recruits appears to be between 0.15% and 0.40%.

Less information is available on the extent of generalized bone loss in adolescents and young adults. Manson and Lehner (1974) found 2 cases of generalized involvement



among 22 patients aged 15-22 years. Horman and Frandsen (1970) studied 156 patients with juvenile periodontitis and reported that generalized involvement was not found in 12-18 year olds, but 35% of 26-32 year olds with bone loss had generalized involvement. To date, no studies have reported on the prevalence of localized, intermediate or generalized periodontitis in a large sample population.

Juvenile periodontitis has been reported in most racial groups. Several studies have suggested an increased prevalence in Blacks as compared to Caucasians (Table 2). Hew and Killoy (1979), in their study in a young military population, reported a prevalence of 0.410% in Blacks and 0.198% in Caucasians. Burmeister et al. (1984) thought that "age," when analyzed either as a categorical or as a continuous variable, caused any relationship to race in juvenile periodontitis patients to disappear.

In a nonepidemiological study, Burmeister et al. (1984) reported an equal involvement in Blacks and Caucasians who were involved with "Severe Periodontitis." In summation, data suggests an increased prevalence of juvenile periodontitis in Blacks compared to Caucasians, with 2:1 more Blacks being affected than Caucasians.

#### F. AGE

The age of onset of juvenile periodontitis has been defined as circumpubertal. (Baer, 1971) The upper age limit

TABLE 2

## RACIAL PREVALENCE OF JUVENILE PERIODONTITIS

<u>STUDY</u>	<u>BLACKS</u>	<u>CAUCASIANS</u>
Russell (1957)	3.2%	3.0%
Kaslick and Chasens (1968)	2/241	4/3,656
Manson and Lehner (1974)	10/22	6/22
Hew and Killoy (1979)	0.41%	0.19%
Johnson et al. (1980)	9/10	1/10
Burmeister et al. (1984)	3.1/1 ratio	

is more difficult to define, with age limitation varying among studies (Table 3). Most authors use 22 years as the upper age limit; however, several studies have included patients up to 30 years of age.

Studies on generalized bone loss in young people have included patients ranging in age from puberty to 35 years of age. (Page and Schroeder, 1982) Ranney (1981b) included patients less than 30 years of age and Burmeister et al. (1984) included patients 11-30 years of age. The upper age limit for this population study group was 27 years.

#### G. SEX

Juvenile periodontitis has been more frequently observed in females than males (Table 4). In the only study to report sex ratios in a cross-sectional military population, aged 18-22 years, Hew and Killoy (1979) reported no significant difference in female to male ratio overall, within Blacks, or within Caucasians. In contrast, Hormand and Frandsen (1979) found a female to male ratio of 5.3/1 in patients 12-18 years of age, compared to 26-32 years of age in which the ratio was 1.5/1. This decrease in the female to male ratio with age was also observed by Gjermo et al. (1984). The authors suggested that because puberty occurs earlier in females, juvenile periodontitis may manifest earlier and lead to a higher prevalence in females in younger age groups.

TABLE 3

## AGE OF JUVENILE PERIODONTITIS PATIENTS

<u>STUDY</u>	<u>AGE</u>
Manson and Lehner (1974)	14-21
Slots (1976)	16-24
Levine et al. (1979)	12-28
Hormand and Frandsen (1980)	12-25
Liljenberg and Lindhe (1980)	14-18
Saxen (1980)	13-30
Listgarten et al. (1981)	12-23
Gebhard et al. (1982)	14-20
Burmeister et al. (1984)	10-28

TABLE 4

## FEMALE/MALE PREVALENCE OF JUVENILE PERIODONTITIS

<u>STUDY</u>	<u>FEMALE</u>	<u>MALE</u>
Miller et al. (1941)	10	1
Marshall-Day and Shourie (1949)	Higher	
Tenenbaum et al. (1950)	Higher	
Seidler et al. (1950)	10	1
Benjamin and Baer (1967)	3	1
Rao and Tewani (1968)	Higher	
Baer and Benjamin (1974)	3	1
Manson and Lehner (1974)	Higher	
Newman et al. (1976)	1	1
Melnick et al. (1976)	2	1
Manson (1977)	3	1
Hew and Killoy (1978)	1.05	1
Hormand and Frandsen (1979)	2.5	1
Saxen (1980)	5	3
Burmeister et al. (1984)	1.9	1

Studies looking at the female to male ratio of generalized juvenile periodontitis are limited. In one study, Burmeister et al. (1984) has shown a higher prevalence in females than males, by a ratio of 2/1.

#### H. Geographic

Several authors have speculated on a geographic difference in the prevalence of juvenile periodontitis. Dawson (1948) found "Periodontosis" to be more prevalent in upper Egypt than lower Egypt. Kaslick and Chasens (1969), in a study of U.S. Army recruits, found all of their cases of juvenile periodontitis to be from the Southwest area of the United States. Rao and Tewani (1968) found a geographic variance in the distribution of juvenile periodontitis in India. Baer (1971) and Baer and Benjamin (1974) felt that the differences in prevalence reported in the literature for juvenile periodontitis might be a true reflection of geographic differences in prevalence. Lacy and Brasher (1977), in a study of U.S. military recruits, also thought the prevalence of juvenile periodontitis might be higher in the Southwest, since 9 of their 13 patients with juvenile periodontitis were from this area.

#### I. Pattern of Bone Loss

Wannenmacher (1938) was the first to describe juvenile periodontitis as an entity characterized by localized

permanent first molar and incisor bone loss. This pattern of bone loss has subsequently been described by many authors. (Miller, 1941; Kaslick and Chasens, 1978; Baer, 1971; Baer and Benjamin, 1974; Hormand and Frandsen, 1979; Newman, 1981; Burmeister et al., 1984) The classic first molar radiographic bone loss pattern has been described as being vertical or arc like, with bone loss extending from the distal of the second premolar to the mesial of the second molar. (Yount, 1956; Baer, 1971; Baer and Benjamin, 1974; Manouchehr-Pour and Bissada, 1979)

In addition, bone loss in juvenile periodontitis has been described as being symmetrical or mirror image in pattern. (Kaslick and Chasens, 1968; Baer, 1971; Baer and Benjamin, 1974; Manson, 1977; Hormand and Frandsen, 1979; Newman, 1981; Page and Schroeder, 1982; Burmeister et al., 1984)

Studies also suggest that there is increased tooth involvement with age. Hormand and Frandsen (1979) looked at 3 age groups, 12-18, 19-25 and 26-32 years of age, and 3 types of bone loss, Type I - Molar/incisor, Type II - Molar/incisor and some additional teeth, but < 14 teeth, and Type III - Generalized involvement  $\geq$  14 teeth. They found that the number of involved teeth increased from 5.3 teeth in the youngest group to 11.6 teeth in the oldest age group. They also found that the frequency of Type I involvement decreased from 55% in the youngest group to 7% in the oldest age group.

In contrast, the frequency of Type II involvement was about the same in all age groups, and the frequency of Type III involvement increased from 0 in the youngest group to 35% in the oldest age group. An increase in tooth involvement with age has been supported by other authors. (Ranney, 1981b; Fine, 1984; Burmeister, 1984; Saxen and Murtomaa, 1985)

The radiographic picture of generalized disease in adolescents or young adults is limited. In one study, the pattern of bone loss was found to be symmetrical in pattern, with the most severe bone loss occurring in the molar/incisor area. (Burmeister, 1984) In contrast, Page et al. (1983) have stated that there is no distinct pattern associated with generalized bone loss (rapidly progressive periodontitis) in young persons.

#### J. Mobility

Early investigators (Gottlieb, 1923; Thoma and Goldman, 1937, 1940; Tenenbaum, 1950) felt that the first signs of juvenile periodontitis were loosening and wandering of the teeth. Prichard (1965) stated that juvenile periodontitis did not exist as a separate disease entity and felt that the mobility and migration of teeth found in these patients could be accounted for by traumatic occlusion. In addition, Prichard felt that bone loss and pocket formation did not occur until inflammation was present. Mobility has



been used as a screening test for juvenile periodontitis. (Kaslick and Chasens, 1968) Newman, in 1981, suggested that mobility is a late finding in the disease process following extensive bone loss.

K. Inflammation, Plaque and Bleeding on Probing

Early authors (Gottlieb, 1923; Thoma and Goldman, 1940; Tenenbaum, 1950) described the gingiva in juvenile periodontitis as appearing normal, with little or no inflammation being present. Baer (1971) and Baer and Benjamin (1974) stated that plaque and calculus were present in cases of "Periodontosis," but not in amounts commensurate with the amount of destruction present. Manson (1973) also observed that there were frequently no clinical signs of gingival inflammation or bleeding associated with affected sites in juvenile periodontitis patients. In addition, these patients had low plaque scores. Other authors have also reported that the amount of local factors and inflammation present is not commensurate with the amount of destruction seen in these patients. (Manouchehr-Pour, 1979; Page and Schroeder, 1982; Cogen, 1984)

In contrast, Wannemacher (1938) described inflammation and bleeding on probing as early signs of the disease. Russell (1967) thought that cases of juvenile periodontitis were always associated with inflammation and local irritants. In 1968, Prichard suggested that the bone

loss seen in these patients was a direct result of local factors. Microbial plaque has been demonstrated to be present on affected teeth in juvenile periodontitis patients. Waerhaug (1976, 1977a, 1977b) observed a thin (20-200  $\mu$ ) layer of plaque .2 to 1.1 mm from the junctional epithelium to be always present on teeth associated with juvenile periodontitis lesions. In addition, Sugarman and Sugarman (1971) felt poor oral hygiene and subsequent microbial plaque accumulation were the primary etiologic factors in the disease.

Recently, Burmeister et al. (1984) have shown that affected sites in juvenile periodontitis patients have twice the amount of plaque (PlI) as unaffected sites in the same patients. In addition, the authors showed a higher Gingival Index and Bleeding Index for affected sites in juvenile periodontitis patients compared to unaffected sites in the same patients.

In patients who have been described with generalized juvenile periodontitis or rapidly progressive periodontitis, authors agree that there appears to be an increase in inflammation, plaque and bleeding on probing in these patients compared to localized juvenile periodontitis patients. This has been shown by Ranney et al. (1981a), Page and Schroeder (1982), Page et al. (1983), and Burmeister et al. (1984).

## L. Calculus

Calculus has been described as being seen infrequently in juvenile periodontitis patients. Kaslick and Chasens (1968) looked at calculus patterns on teeth extracted from juvenile periodontitis patients. In the majority of cases, supragingival and marginal subgingival calculus was present. In contrast, two thirds of the teeth evaluated showed little or no deep subgingival calculus. The authors found a negative correlation between deep subgingival calculus and the extent of bone loss in these patients.

Waerhaug (1976, 1977b) found that, although plaque was always present on extracted teeth associated with juvenile periodontitis lesions, calculus was rarely found. Manouchehr-Pour and Bissada (1979), in their review of the literature, concluded that gross subgingival calculus was uncommon in juvenile periodontitis patients. Similarly, Liljenberg and Lindhe (1980) found roots of affected teeth with juvenile periodontitis patients to be free of calculus. Lindskog and Blomlof (1983) examined four first molars, from four different patients with juvenile periodontitis, utilizing scanning electron microscopy, and found no visible subgingival calculus to be present on any of the root surfaces examined.

Cogen et al. (1984), in two case reports, observed that, while calculus, microbial plaque and gingival inflammation were present, the amounts were not consistent with the amount of alveolar bone destruction seen.

Vandesteen et al. (1984) examined six siblings with juvenile periodontitis and noted significant amounts of coronal plaque and calculus on affected teeth. However, they did not examine for the presence of subgingival plaque or calculus. To date, there have been no studies addressing the presence or absence of calculus in patients with generalized disease.

### III. METHODS AND MATERIALS

#### A. Patient Selection

For a 3-month period, the panoramic radiographs were screened (Davies et al., 1977) for all personnel entering the Air Force at Lackland AFB, San Antonio, Texas. Those persons whose panoramic radiographs showed evidence of vertical or horizontal alveolar bone loss were invited to participate in the study. All screenings of radiographs were performed by one dentist whose primary job is screening panoramic radiographs for pathology. All participants were required to sign an informed consent prior to being included in the study. (Appendix A) The treatment and care of all patients complied with Air Force Regulation 169-6 and Medical Center Regulation 169-9.

#### B. Data Collection

Patients participating in the study were clinically evaluated for alveolar bone loss, gingival inflammation, supragingival plaque, calculus, clinical probing depths, bleeding upon probing and balancing interferences. A dental history, medical history and clinical laboratory procedures including fasting blood glucose, Antinuclear Antibody and CBC with differential were completed on each patient participating in the study, to rule out trauma or systemic disease. In addition, the patient's race, sex, age and geographical

location of enlistment were documented. A full mouth series of intraoral periapical radiographs, consisting of 18 films, were taken on each patient. All data collection was documented on a prepared patient documentation form. (Appendices C-1 thru C-36) In addition, the following parameters were assessed:

1. Alveolar Bone Loss: Alveolar bone loss was assessed from full mouth periapical radiographs. Radiographs were taken using a long cone paralleling technique and a Rinn XCP film holder. A Fixott-Everett grid was used with each radiograph. The amount of radiographic bone loss was measured by the technique of Schei. (Schei et al., 1959)

- a. Category of bone loss: (Hormand and Frandsen, 1979) A tooth was defined as having alveolar bone loss if either the mesial or distal surface exhibited  $\geq 20\%$  bone loss as measured by the technique of Schei.

Type I: First molars and/or incisors ( $\leq 12$  teeth)

Type II: First molars, incisors, and a few additional teeth ( $< 14$  teeth)

Type III: Generalized involvement ( $\geq 14$  teeth)

- b. Pattern of bone loss for individual teeth:

- (1) Horizontal versus angular type of bone loss. Mesial and distal surfaces were evaluated separately.



(2) Extent of the root involved. Mesial and distal surfaces were evaluated separately.

Type A: < 20% loss

Type B: 20-40% loss

Type C: 50-70% loss

Type D: 80-100% loss

c. Other radiographic findings:

(1) The presence or absence of radiographic involvement of furcations.

(2) The presence or absence of radiographic evidence of calculus. Mesial and distal surfaces were evaluated independently.

d. The distribution of alveolar involvement according to individual teeth:

(1) Maxillary versus mandibular arch involvement.

(2) The most frequently affected teeth.

(3) The least frequently affected teeth.

(4) Bilateral versus unilateral involvement (mirror effect).

2. Gingival Inflammation: Clinical gingival inflammation was assessed using the Gingival Index (GI) of Loe and Silness (1963).

Each of the four gingival areas of each tooth (mesial, distal, facial, lingual) were scored 0-3 using the following criteria:

0 = Normal gingiva.

1 = Mild inflammation - slight change in color, slight edema. No bleeding on probing.

2 = Moderate inflammation - redness, edema and glazing. Bleeding on probing.

3 = Severe inflammation - marked redness and edema. Ulceration. Tendency to spontaneous bleeding.

The scores were totaled and divided by number of surfaces scored to provide a GI for the patient.

3. Plaque: The amount of plaque accumulation was assessed according to the Plaque Index (PLI) of Silness and Loe (1964).

Each of the four areas of the tooth (mesial, distal, facial, lingual) were scored 0-3 using the following criteria:

0 = No plaque in the gingival area.

1 = A film of plaque adhering to the free gingival margin and adjacent area of the tooth. The plaque may only be recognized by running a probe across the tooth surface.

2 = Moderate accumulation of soft deposits within the gingival pocket, on the gingival margin and/or adjacent tooth surface, which can be seen by the naked eye.



3 = Abundance of soft matter within the gingival pocket and/or on the gingival margin and adjacent tooth surface.

The scores were totaled and divided by the number of surfaces scored to provide a PlI for the patient.

4. Calculus: The presence or absence of calculus was assessed according to the Oral Hygiene Index (O.H.I.) of Greene and Vermillion (1960).

Surfaces were scored 0-3 using the following criteria:

0 = No calculus present.

1 = Supragingival calculus covering not more than one third of the exposed tooth surface.

2 = Supragingival calculus covering more than one third but not more than two thirds of the exposed tooth surface, or the presence of individual flecks of subgingival calculus around the cervical portion of the tooth, or both.

3 = Supragingival calculus covering more than two thirds of the exposed tooth surface, or a continuous heavy band of subgingival calculus around the cervical portion of the tooth, or both.

Each arch was divided into segments comprised of the six anterior teeth, with the remaining teeth included in posterior segments.

Individual scores were derived for the buccal and lingual surfaces in recognition of the differences in hygiene status that may exist between these surfaces.

The index is based on the fraction of the tooth surface area covered by debris or calculus; therefore, only fully erupted permanent teeth were scored.

The 2 debris scores assigned to a segment are based on the buccal and lingual surface with the greatest surface area covered by debris. For calculation of O.H.I., both scores in a segment need not come from the same tooth.

5. Tooth Mobility: Tooth mobility was assessed according to the technique developed by Miller (1938).

Teeth were assigned a mobility score 0-3 according to the following criteria:

- 0 = No mobility other than normal.
- 1 = First sign of mobility greater than normal.
- 2 = Movement of one millimeter in any direction.
- 3 = Movement of more than one millimeter and/or rotation or depression of the tooth.

6. Clinical Probing Depths: Probing depths were assessed by utilizing a spring-loaded, pressure-sensitive probe (University of Washington probe with a University of Michigan -0 type probe head) at 25 ponds of force. All probing measurements were taken from the gingival margin. For mesial and distal measurements, the probe

was aligned parallel to the long axis of the tooth against the interproximal contact and angled no more than 5° from the vertical axis, to end below the contact point. Six measurements were taken on each tooth:

1. Mesio Buccal, 2. Buccal, 3. Distobuccal,
4. Distolingual, 5. Lingual, 6. Mesiolingual.

a. Type of attachment loss: Attachment loss was defined as  $\geq 5.0$  mm of probing depth. (Vandesteen et al., 1984)

Type I: First molars and/or incisors  
( $\leq 12$  teeth)

Type II: First molars, incisors and a few additional teeth (< 14 teeth)

Type III: Generalized involvement ( $\geq 14$  teeth)

7. Bleeding Upon Probing: Bleeding upon probing was assessed according to the technique of Muhlemann and Mazar (1958). The gingival sulcus was gently probed, and the presence or absence of bleeding was documented.

8. Occlusion: An occlusal examination consisted of an evaluation for the presence or absence of balancing interferences.

9. Photographs: The clinical appearance of gingival tissue was documented with 35 mm slides.

C. Definitions

Radiographic Affected Site =  $\geq$  20% bone loss on mesial or distal tooth surfaces.

Radiographic Affected Tooth =  $\geq$  20% bone loss on mesial and/or distal tooth surfaces.

Radiographic Type A Bone Loss = 0-10% bone loss.

Radiographic Type B Bone Loss = 20-40% bone loss.

Radiographic Type C Bone Loss = 50-70% bone loss.

Radiographic Type D Bone Loss = 80-100% bone loss.

Radiographic Type I Patient = Radiographically affected teeth include first molars and/or incisors only.

Radiographic Type II Patient = Radiographically affected teeth include first molars and/or incisors and a few additional teeth, but  $< 14$  teeth.

Radiographic Type III Patient = Radiographically affected teeth include  $\geq 14$  teeth.

Clinical Affected Site =  $\geq 5$  mm of clinical probing depth on mesial, facial, lingual or distal tooth surfaces.

Clinical Affected Tooth =  $\geq 5$  mm of clinical probing depth on mesial and/or facial and/or lingual and/or distal surfaces.

Clinical Type I Patient = Clinically affected teeth include first molars and/or incisors only.

Clinical Type II Patient = Clinically affected teeth include first molars and/or incisors and a few additional teeth, but  $< 14$  teeth.

Clinical Type III Patient = Clinically affected teeth include  $\geq 14$  teeth.

Combined Affected Site =  $\geq 20\%$  bone loss and/or  $\geq 5$  mm of clinical probing depth on mesial, facial, lingual or distal tooth surfaces.

Combined Affected Tooth =  $\geq 20\%$  bone loss and/or  $\geq 5$  mm of clinical probing depth on mesial and/or facial and/or lingual and/or distal surfaces.

Combined Type I Patient = Combined affected teeth include first molars and/or incisors only.

Combined Type II Patient = Combined affected teeth include first molars and/or incisors and a few additional teeth. but  $< 14$  teeth.

Combined Type III Patient = Combined affected teeth include  $\geq 14$  teeth.

D. Analysis of Data

Means were compared using the Student's t test. All other data were compared using the Chi-square test, except for tables with cells equal to zero where the Fisher Exact Test (2 Tail) was used.

These analyses were done on a DEC VAX-11/780 Computer using the BMDP statistical software package, University of California, 1981. A 0.05 level of significance was used.

#### IV. RESULTS

##### A. Population, Sample and Prevalence

The panoramic radiographs of 16,658 U.S. Air Force basic trainees were examined for evidence of alveolar bone loss. The population (Table 5) was predominantly Caucasian (81.1%), male (85.7%) and less than 22 years of age (80.0%). A total of 51 basic trainees showed evidence of alveolar bone loss and were invited to participate in this study. Following a clinical examination and a full mouth radiographic series, patients were either eliminated from the study or assigned to a Clinical, Radiographic and Combined Type group. Eight patients were unavailable for clinical examination but, on the basis of panoramic radiographs, were assigned to a Radiographic and Combined Type group. The remaining 43 patients were clinically examined, and 7 of these were eliminated for having either little or no alveolar bone loss or isolated areas of alveolar bone loss with a history of trauma to the area. The sample consisted of 44 patients. On the basis of a routine physical examination, prior to entry to active duty, and the results of laboratory screening tests, all patients were judged to be healthy.

The sample (Table 6) included 44 patients, consisting of 31 Blacks, 11 Caucasians and 2 other. Thirty-one patients were male and 12 were female. A total of 23 patients were

TABLE 5

## POPULATION BY AGE, SEX AND RACE

		<u>AGE</u>	<u>17-21</u>	<u>%</u>	<u>22-27</u>	<u>%</u>	<u>TOTAL</u>	<u>%</u>
<u>SEX</u>	<u>RACE</u>							
Male	Caucasian		9508	(57.1)	2202	(13.2)	11710	(70.3)
	Black		1532	( 9.2)	404	( 2.4)	1936	(11.6)
	Other		485	( 2.9)	153	( 0.9)	638	( 3.8)
Total Male			11525	(69.2)	2759	(16.6)	14284	(85.7)
Female	Caucasian		1383	( 8.3)	416	( 2.5)	1799	(10.8)
	Black		338	( 2.0)	138	( 0.8)	476	( 2.9)
	Other		73	( 0.4)	26	( 0.2)	99	( 0.6)
Total Female			1794	(10.8)	580	( 3.5)	2374	(14.3)
Total Caucasian			10891	(65.4)	2618	(15.7)	13509	(81.1)
Total Black			1870	(11.2)	542	( 3.3)	2412	(14.5)
Total Other			558	( 3.3)	179	( 1.1)	736	( 4.4)
Total			13319	(80.0)	3339	(20.0)	16658	(100)

Sample Size    n = 16658

TABLE 6

## SAMPLE BY AGE, SEX, RACE AND PREVALENCE

	<u>AGE</u>	<u>17-21</u>	<u>PREVALENCE</u>	<u>22-27</u>	<u>PREVALENCE</u>	<u>TOTAL</u>	<u>PREVALENCE</u>
<u>SEX</u>	<u>RACE</u>						
	Caucasian	2	( .02)	5	( .23)	7	( .06)
Male	Black	13	( .84)	11	( .72)	24	(1.24)
	Other	0	(0)	1	( .65)	1	( .16)
Total Male		15	( .13)	17	( .62)	32	( .22)
	Caucasian	4	( .29)	0	(0)	4	( .22)
Female	Black	3	( .89)	4	(2.90)	7	(1.47)
	Other	1	(1.36)	0	(0)	1	(1.01)
Total Female		8	( .45)	4	( .70)	12	( .51)
Total Caucasian		6	( .06)	5	( .19)	11	( .08)
Total Black		16	( .86)	15	(2.77)	31	(1.29)
Total Other		1	( .18)	1	( .56)	2	( .27)
Total		23	( .17)	21	( .63)	44	( .26)

Sample Size n = 44

Includes 8 patients not clinically examined.  
Panorex Only.



between 17 and 21 years of age, and 21 were between 22 and 27 years of age. The overall prevalence of juvenile periodontitis in the sample was .26%. Five patients were judged to have localized juvenile periodontitis or a prevalence of .03%. Fourteen patients were considered to have intermediate juvenile periodontitis or a prevalence of .08%. Twenty-five were judged to have generalized juvenile periodontitis or a prevalence of .15%. Three patients were identified who demonstrated generalized horizontal bone loss without more severe involvement of first molars or incisors. These patients may have had rapidly progressive periodontitis (prevalence - .02%). When considering regional differences within the sample, a comparison of the prevalence from 7 geographic areas within the United States (Table 7) revealed no significant difference between the areas.

#### B. Sex and Race

A comparison between sex and race groups in this study (Table 6) revealed the following: a female to male ratio of 1/2.7, a Black to Caucasian ratio of 2.8/1, a Black male to Caucasian male ratio of 3.4/1, a Black female to Caucasian female ratio of 1.75/1; a Black female to Black male ratio of 1/3.4 and a Caucasian female to Caucasian male ratio of 1/1.75.

TABLE 7

## COMPARISON OF PREVALENCE BY GEOGRAPHIC AREA TO OVERALL PREVALENCE

Overall Prevalence	.26			
Geographic Area 1 Prevalence	.27	Chi square =	.03	p = .85
Geographic Area 2 Prevalence	.33	Chi square =	.38	p = .53
Geographic Area 3 Prevalence	.25	Chi square =	.01	p = .97
Geographic Area 4 Prevalence	0	Fisher Exact Test (2 Tail)		p = .14
Geographic Area 5 Prevalence	.10	Chi square =	1.54	p = .21
Geographic Area 6 Prevalence	.38	Chi square =	.49	p = .48
Geographic Area 7 Prevalence	.27	Chi square =	.23	p = .63

A comparison of the prevalence for sex and race groups in this study (Table 8) revealed the following: a female to male ratio 2.32/1 ( $p = .02$ ); a Black to Caucasian ratio of 16.13/1 ( $p < .0001$ ); a Black male to Caucasian male ratio of 20.67/1 ( $p < .0001$ ); a Black female to Caucasian female ratio of 6.68/1 ( $p = .002$ ); a Black female to Black male ratio of 1.19/1 (no significant difference) and a Caucasian female to Caucasian male ratio of 3.67/1 (no significant difference).

#### C. Radiographic Groups

On the basis of the radiographic examination, the patients were placed into Radiographic Groups according to which teeth were involved (Table 9). Radiographic Group I included 7 patients, of which only 2 were available for a clinical examination. The percentage of teeth affected in this group is shown in Figure 1. Radiographic Group II included 20 patients, 17 of which were available for a clinical examination. The percentage of teeth affected in this group is shown in Figure 2. The most frequently affected teeth in this group were the first molars and incisors. The least frequently affected teeth were the cuspids. Radiographic Group III included 17 patients, all of which were available for a clinical examination. The percentage of teeth affected in this group is shown in Figure 3. Again, the most

TABLE 8

## COMPARISON OF PREVALENCE BETWEEN SEX AND RACE GROUPS

	<u>MALE</u>	VS	<u>FEMALE</u>
Prevalence	.22		.51
	Chi square = 5.10		p = .02
	<u>BLACK</u>	VS	<u>CAUCASIAN</u>
Prevalence	1.29		.08
	Chi square = 108.2		p < .0001
	<u>BLACK MALE</u>	VS	<u>CAUCASIAN MALE</u>
Prevalence	1.24		.06
	Chi square = 96.9		p < .0001
	<u>BLACK FEMALE</u>	VS	<u>CAUCASIAN FEMALE</u>
Prevalence	1.47		.22
	Chi square = 9.73		p = .002
	<u>BLACK MALE</u>	VS	<u>BLACK FEMALE</u>
Prevalence	1.24		1.47
	Chi square = .03		p = .86
	<u>CAUCASIAN MALE</u>	VS	<u>CAUCASIAN FEMALE</u>
Prevalence	.06		.22
	Chi square = 3.26		p = .07

TABLE 9

## DISTRIBUTION OF RADIOGRAPHIC BONE LOSS TYPES BY SEX AND RACE

		<u>TYPE I</u>	<u>%</u>	<u>TYPE II</u>	<u>%</u>	<u>TYPE III</u>	<u>%</u>	<u>TOTAL</u>	<u>%</u>
<u>SEX</u>	<u>RACE</u>								
Male	Caucasian	0	(0)	2	( 4.5)	5	(11.4)	7	(15.9)
	Black	5	(11.4)	9	(20.5)	10	(22.7)	24	(54.5)
	Other	0	(0)	1	( 2.3)	0	(0)	1	( 2.3)
Total Male		5	(11.4)	12	(27.3)	15	(34.1)	32	(72.7)
Female	Caucasian	0	(0)	3	( 6.8)	1	( 2.3)	4	( 9.1)
	Black	2	( 4.5)	4	( 9.1)	1	( 2.3)	7	(15.9)
	Other	0	(0)	1	( 2.3)	0	(0)	1	( 2.3)
Total Female		2	( 4.5)	8	(18.2)	2	( 4.5)	12	(27.3)
Total Caucasian		0	(0)	5	(11.4)	6	(13.6)	11	(25.0)
Total Black		7	(19.9)	13	(29.5)	11	(25.0)	31	(70.5)
Total Other		0	(0)	2	( 4.5)	0	(0)	2	( 4.5)
Total		7	(19.9)	20	(45.5)	17	(39.6)	44	(100)

Sample Size    n = 44

Note: Includes 8 patients not clinically examined, panorex radiographs only.

Figure 1. The frequency or percentage of teeth affected  
in Radiographic Group I.

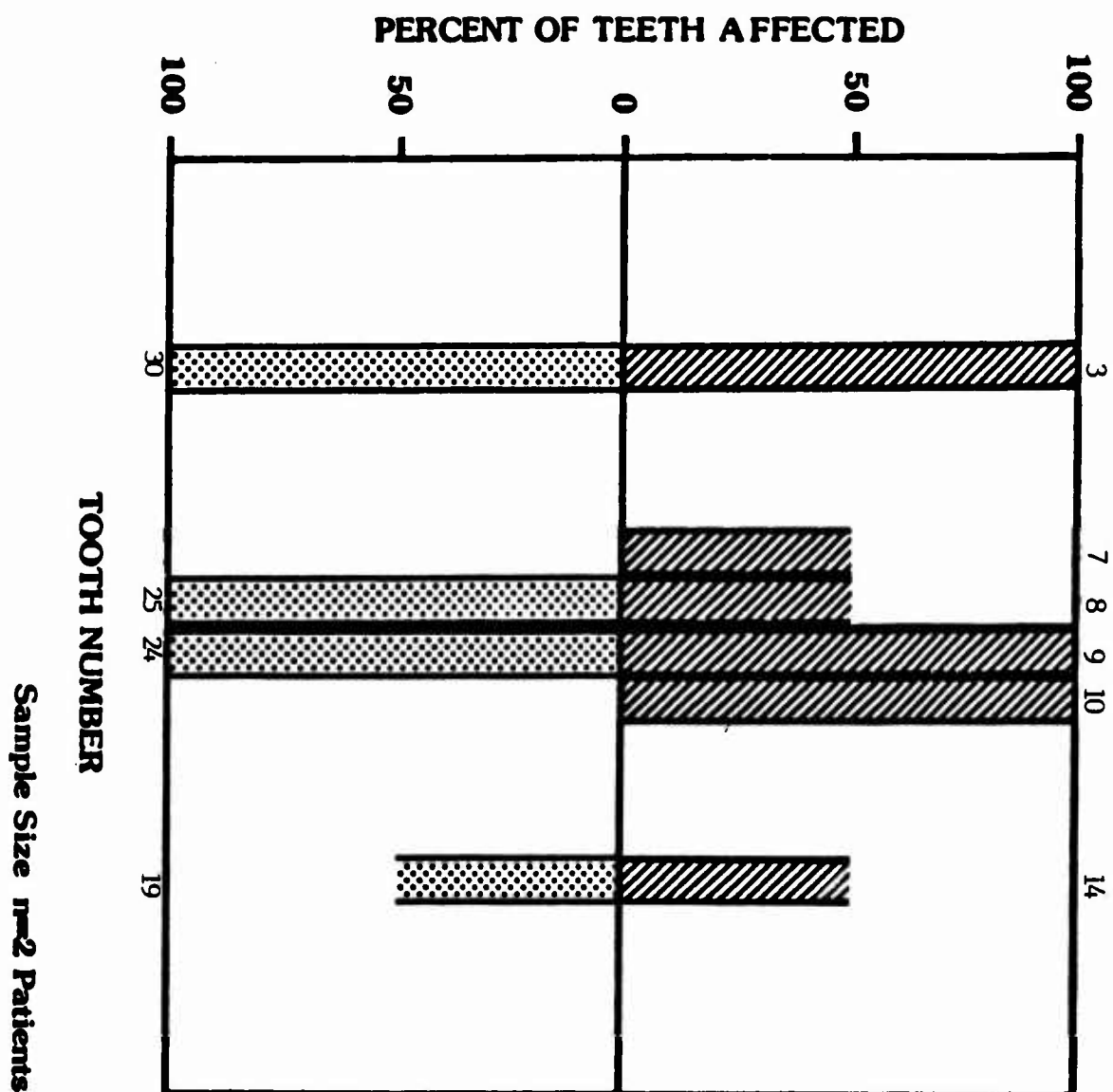


Figure 2. The frequency or percentage of teeth affected  
in Radiographic Group II.



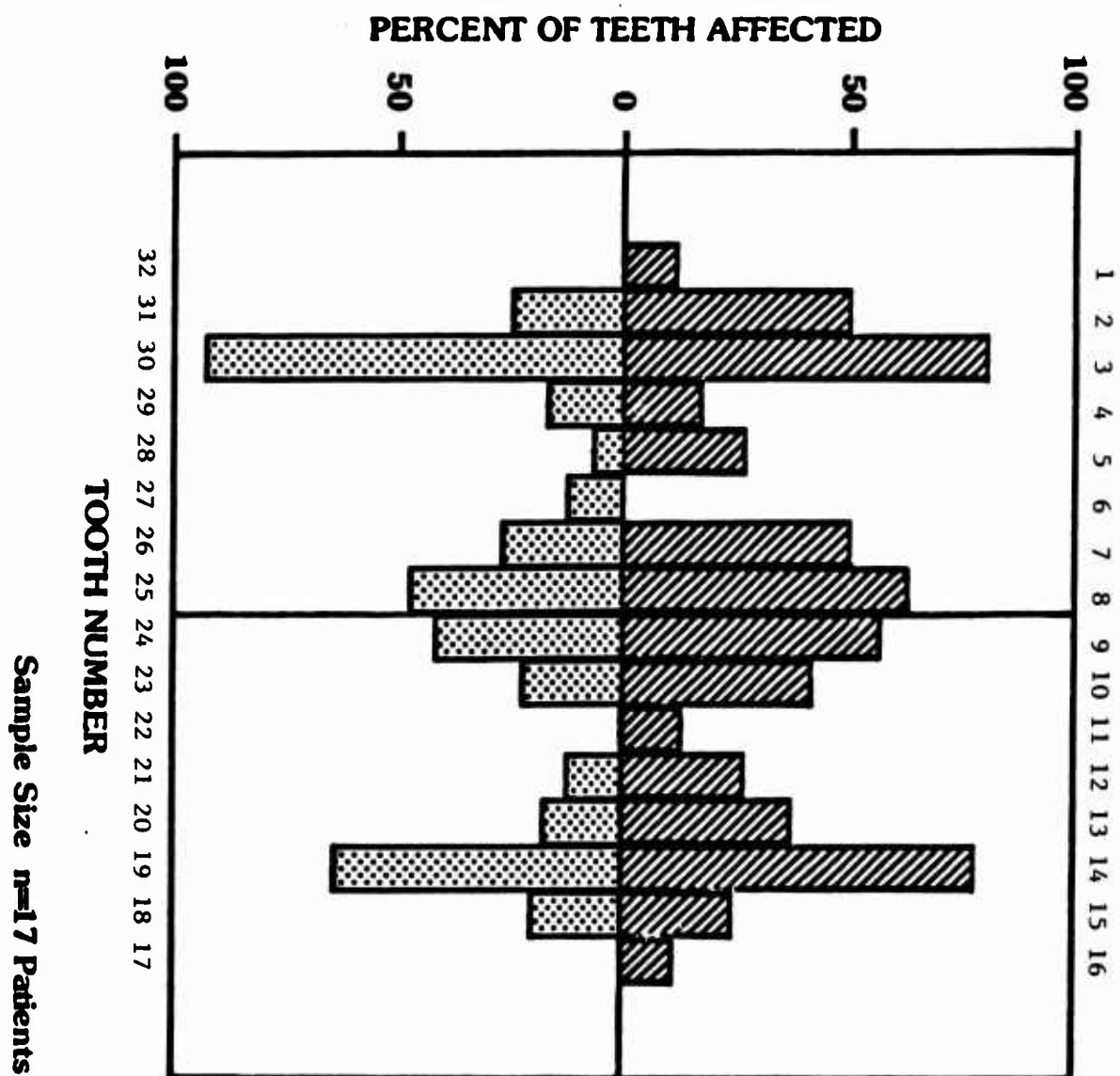
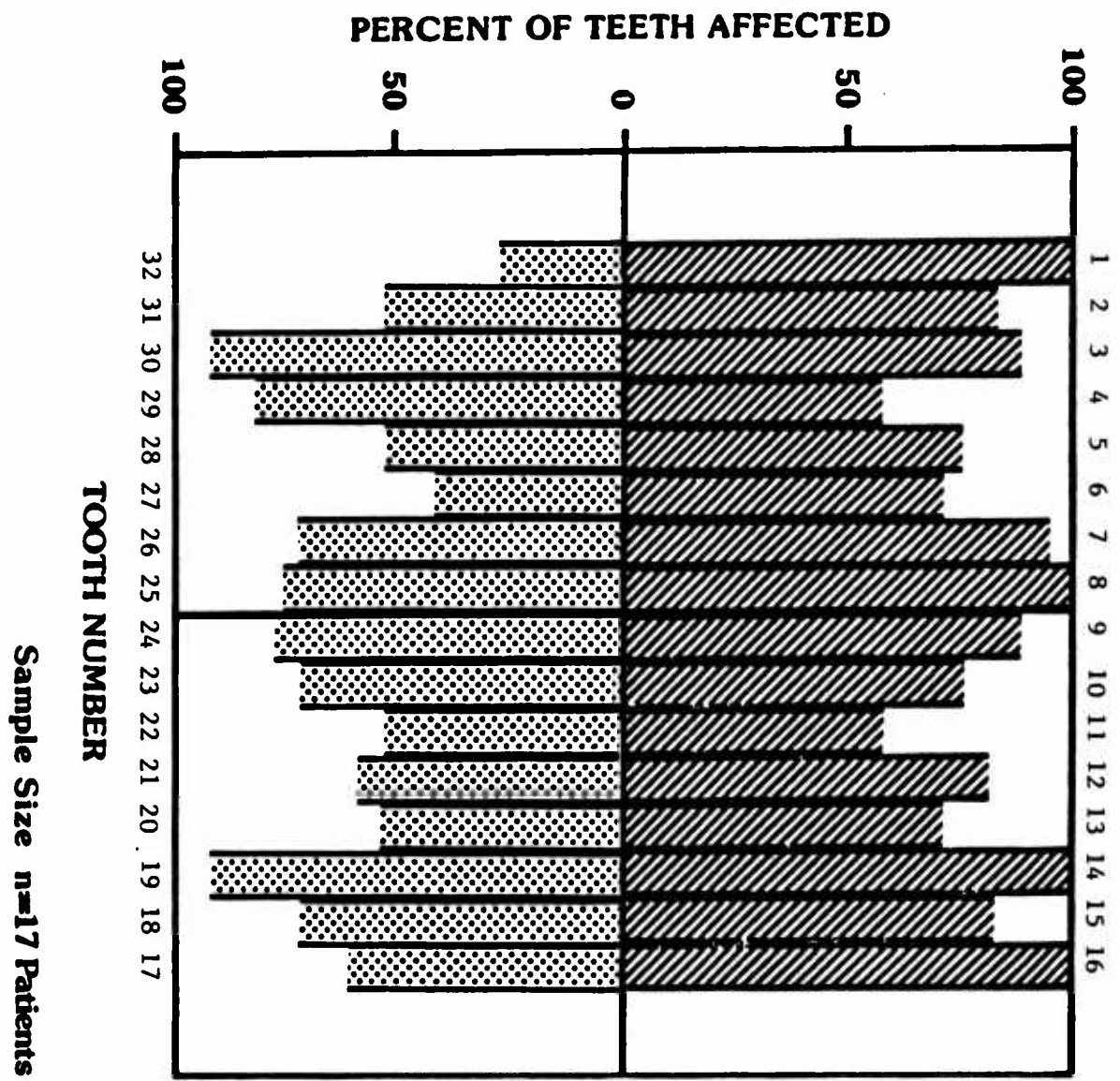


Figure 3. The frequency or percentage of teeth affected  
in Radiographic Group III.



frequently affected teeth in this group were the first molars; and the least frequently affected teeth were the cuspids.

#### D. Clinical Groups

On the basis of clinical examination, patients were assigned to a Clinical Group according to which teeth were involved (Table 10). Clinical Group I (molar-incisor only) included 1 patient, and the percentage of teeth involved is shown in Figure 4. Clinical Group II (< 14 teeth involved) included 18 patients, and the percentage of teeth involved is shown in Figure 5. The most frequently affected teeth in this group were the first molars, and the least frequently affected teeth were the canines and premolars. Clinical Group III (> 14 teeth involved) was comprised of 17 patients, and the percentage of teeth involved is shown in Figure 6. The most frequently affected teeth in this group were the first molars, and the least frequently affected were the canines.

#### E. Combined Groups

On the basis of the radiographic and/or clinical examination, the patients were assigned to a Combined Group according to which teeth were involved (Table 11). Combined Group I (molar-incisor only) included 5 patients, none of which were available for a clinical examination. Combined Group II (< 14 teeth involved) included 14 patients, of which 11 were available for a clinical examination. The percentage

TABLE 10

DISTRIBUTION OF CLINICAL ATTACHMENT LOSS TYPES  
BY SEX AND RACE

		<u>TYPE I</u>	<u>%</u>	<u>TYPE II</u>	<u>%</u>	<u>TYPE III</u>	<u>%</u>	<u>TOTAL</u>	<u>%</u>
<u>SEX</u>	<u>RACE</u>								
Male	Caucasian	1	(2.8)	2	( 2.8)	4	(11.1)	6	(16.7)
	Black	3	(0)	10	(22.2)	11	(30.6)	19	(52.8)
	Other	0	(0)	1	( 2.8)	0	(0)	1	( 2.8)
Total Male		1	(2.8)	10	(27.8)	15	(41.7)	26	(72.2)
Female	Caucasian	0	(0)	4	(11.1)	0	(0)	4	(11.1)
	Black	2	(0)	3	( 8.3)	2	( 5.6)	5	(13.9)
	Other	0	(0)	1	( 2.8)	0	(0)	1	( 2.8)
Total Female		0	(0)	8	(22.2)	2	( 5.6)	10	(27.8)
Total Caucasian		1	(2.8)	5	(13.9)	4	(11.1)	10	(27.8)
Total Black		0	(0)	11	(30.6)	13	(36.1)	24	(66.7)
Total Other		0	(0)	2	( 5.6)	0	(0)	2	( 5.6)
Total		1	(2.8)	18	(50.0)	17	(47.3)	36	(100)

Sample Size    n = 36

Figure 4. The frequency or percentage of teeth affected  
in Clinical Group I.

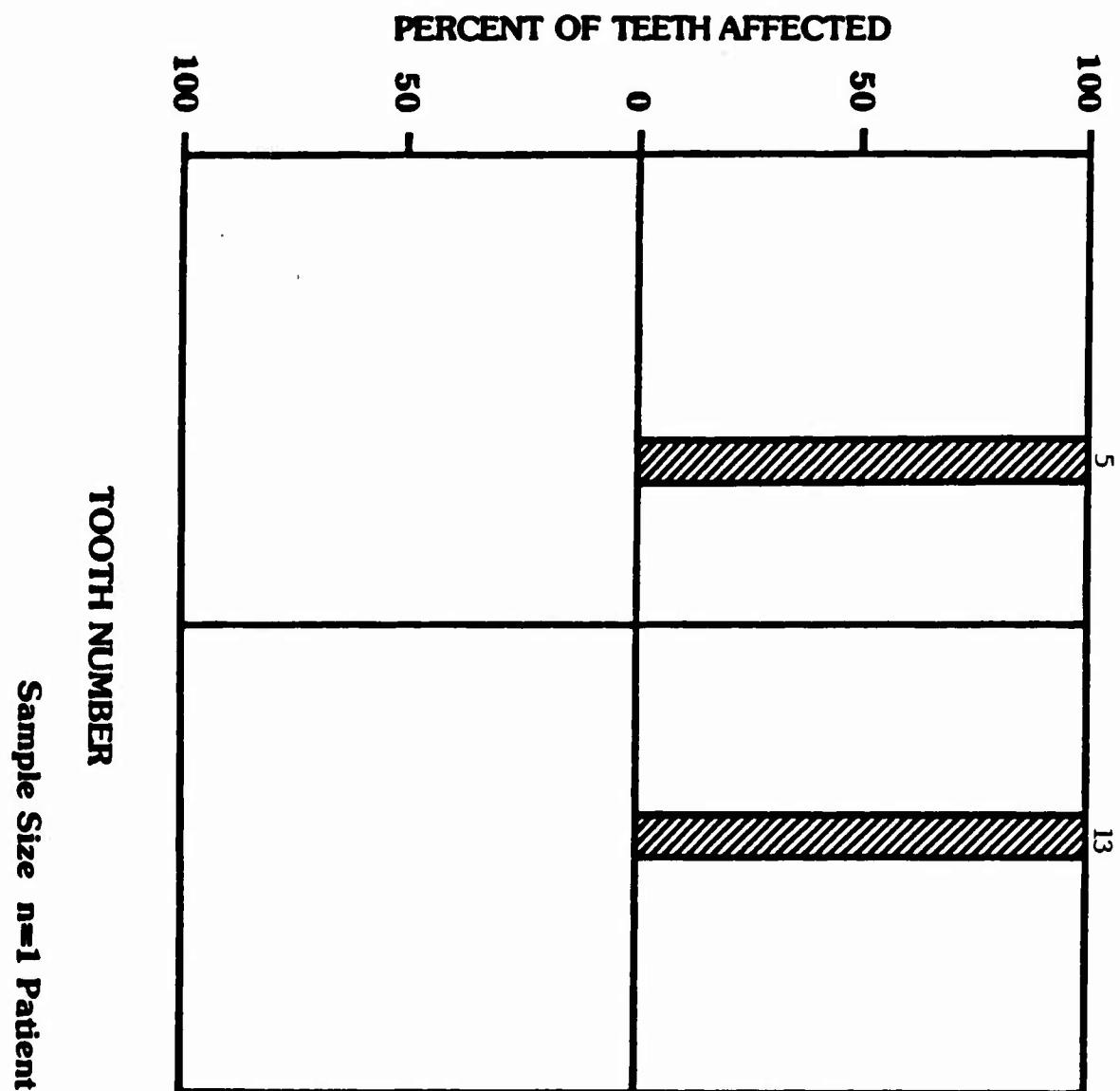


Figure 5. The frequency or percentage of teeth affected  
in Clinical Group II.



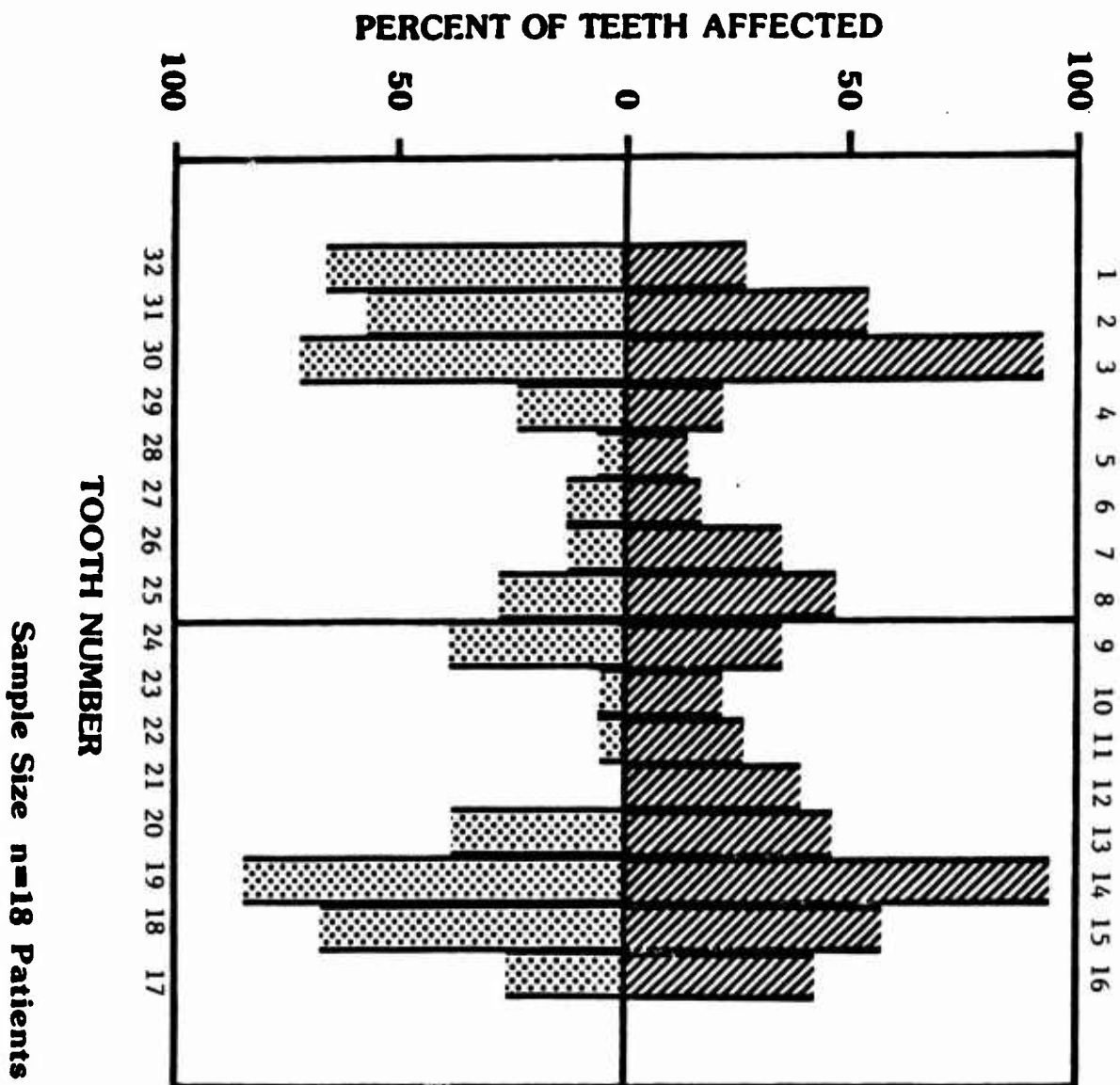


Figure 6. The frequency or percentage of teeth affected  
in Clinical Group III.

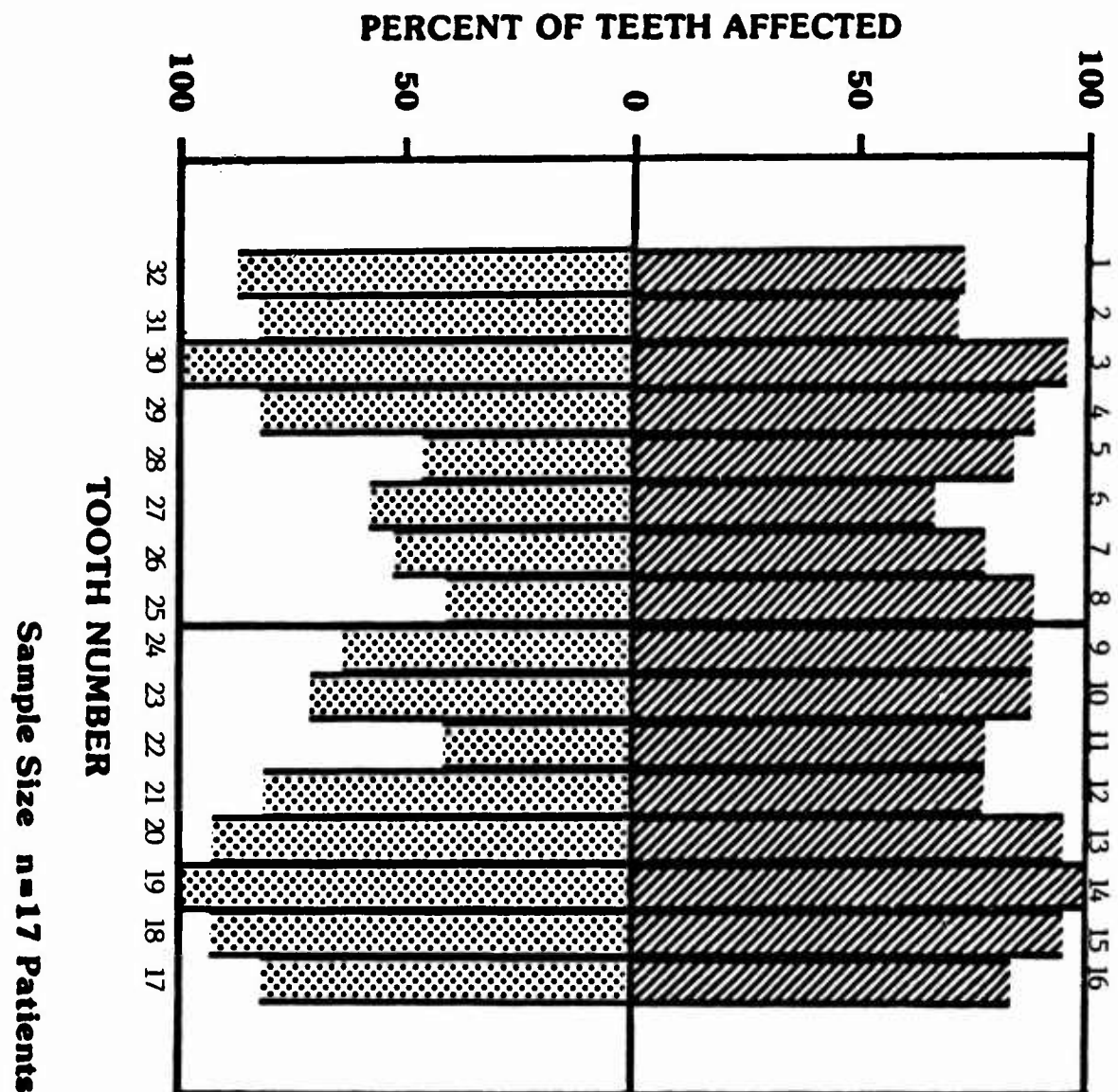


TABLE 11

DISTRIBUTION OF CLINICAL ATTACHMENT LOSS TYPES  
AND/OR RADIOGRAPHIC BONE LOSS TYPES (COMBINED TYPES)  
BY SEX AND RACE

<u>SEX</u>	<u>RACE</u>	<u>TYPE I</u>	<u>%</u>	<u>TYPE II</u>	<u>%</u>	<u>TYPE III</u>	<u>%</u>	<u>TOTAL</u>	<u>%</u>
Male	Caucasian	0	(0)	2	( 4.5)	5	(11.4)	7	(15.9)
	Black	3	( 6.8)	5	(11.4)	16	(36.4)	24	(54.5)
	Other	0	(0)	1	( 2.3)	0	(0)	1	( 2.3)
Total Male		3	( 6.8)	8	(18.2)	21	(47.7)	32	(72.7)
Female	Caucasian	0	(0)	2	( 4.5)	2	( 4.5)	4	( 9.1)
	Black	2	( 4.5)	3	( 6.8)	2	( 4.5)	7	(15.9)
	Other	0	(0)	1	( 2.3)	0	(0)	1	( 2.3)
Total Female		2	( 4.5)	6	(13.6)	4	( 9.1)	12	(27.3)
Total Caucasian		0	(0)	4	( 9.1)	7	(15.9)	11	(25.0)
Total Black		5	(11.4)	8	(10.2)	18	(40.9)	31	(70.5)
Total Other		0	(0)	2	( 4.5)	0	(0)	2	( 4.5)
Total		5	(11.4)	14	(31.8)	25	(56.8)	44	(100)

Sample Size    n = 44

Note: Includes 8 patients not clinically examined, panorex radiograph only.

of teeth involved in Combined Group II is shown in Figure 7. The most frequently affected teeth in this group were the first molars. The least frequently affected teeth were cuspids and premolars. Combined Group III ( $\geq 14$  teeth included) included 25 patients, all of which were available for a clinical examination. The percentage of teeth involved in Combined Group III is shown in Figure 8. The most frequently affected teeth in Combined Group III were the first molars. The least frequently affected teeth were the cuspids, followed by the premolars.

#### F. Effect of Age

The percentage of teeth affected increased with age (Table 12). In 17-21 year olds, 56.13% of the teeth were affected, while in 22-27 year olds, the percentage of affected teeth increased to 76.95%. In addition, the percentage of the population (prevalence) with Combined Type II involvement was 3 times higher in the 22-27 year age group than in 17-21 year olds (Table 13). The prevalence of Combined Type III cases was 4 times higher in 22-27 year olds than in the 17-21 year old age group (Table 14).

#### G. Plaque Index, Gingival Index, Mean Age and Calculus Index

The plaque index by site for Combined Type II patients is shown in Table 15. A higher percentage of the unaffected sites, compared to affected sites, had a plaque

Figure 7. The frequency or percentage of teeth affected  
in Combined Group II.

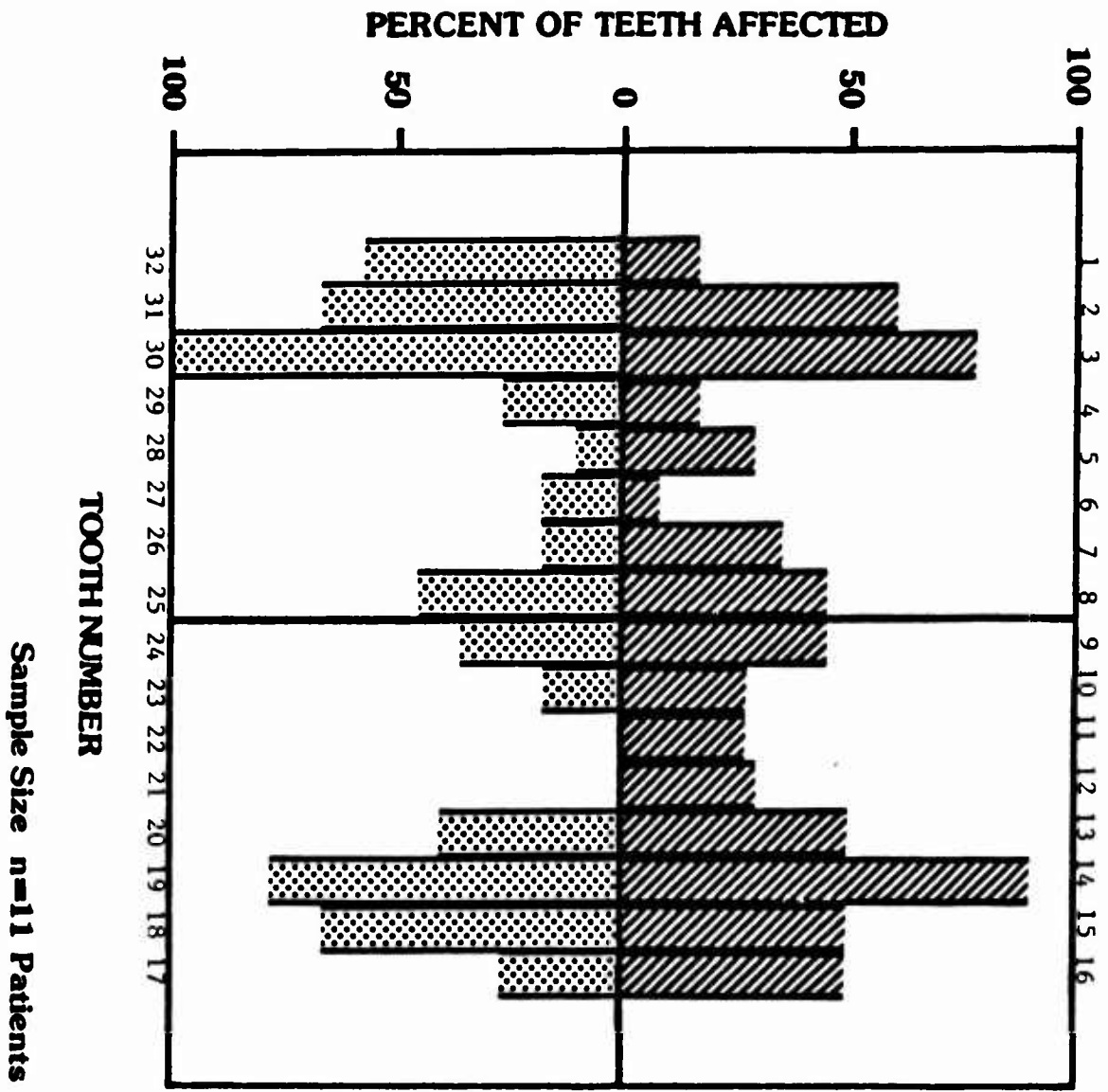


Figure 8. The frequency or percentage of teeth affected  
in Combined Group III.



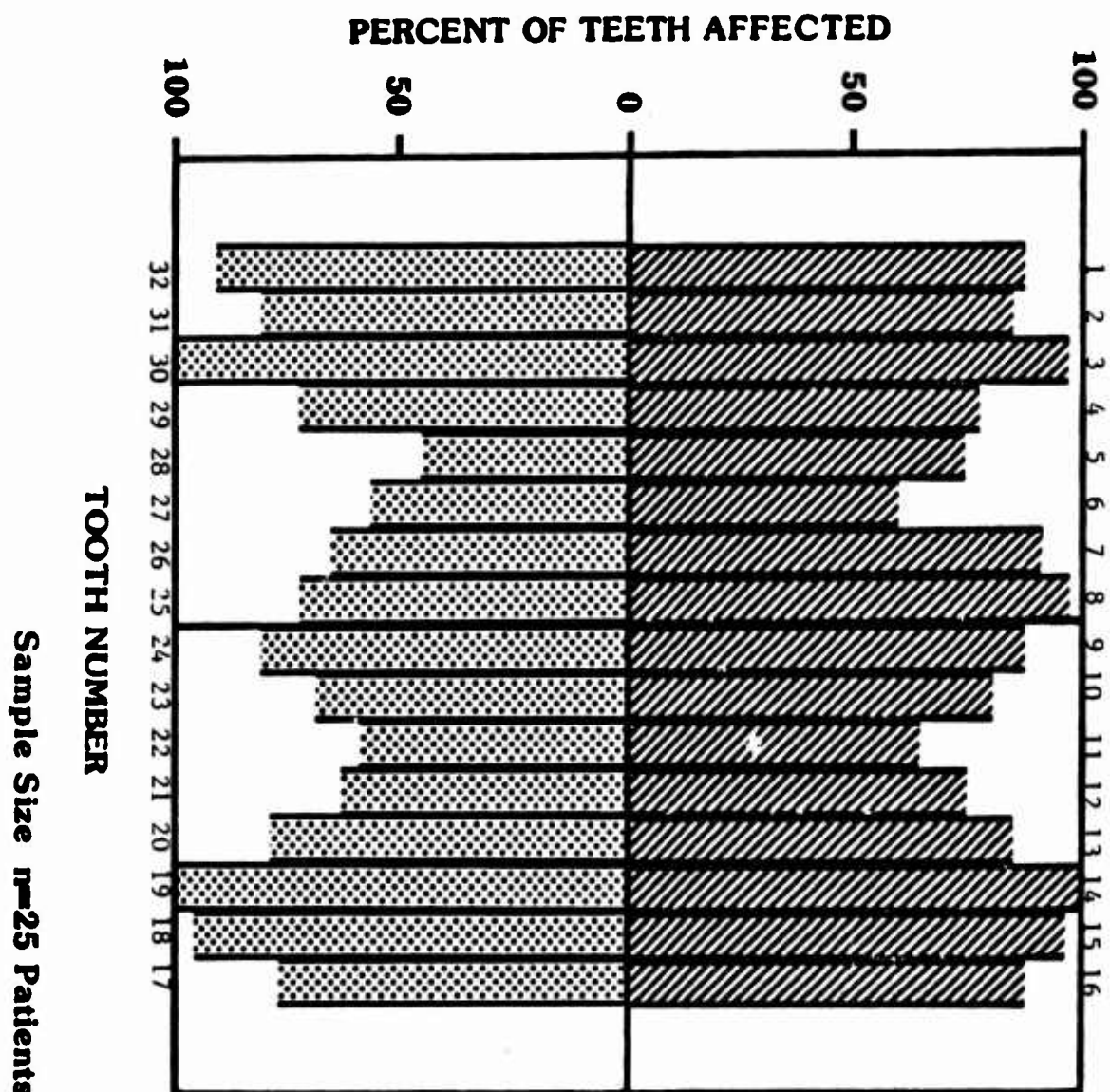


TABLE 12

## DISTRIBUTION OF AFFECTED AND UNAFFECTED TEETH BY AGE GROUP

	<u>AGE</u>	<u>17-21</u>	<u>%</u>	<u>22-27</u>	<u>%</u>	<u>TOTAL</u>	<u>%</u>
Unaffected Teeth		236	(67.8)	112	(32.2)	348	(100)
Affected Teeth		302	(44.7)	374	(55.3)	676	(100)
Total		538	(52.5)	486	(47.5)	1024	(100)

Sample Size    n = 1024

Chi square = 49.3    p = .0001

TABLE 13

## SAMPLE COMBINED TYPE II BY AGE, SEX, RACE AND PREVALENCE

<u>SEX</u>	<u>AGE</u>	<u>17-21</u>	<u>PREVALENCE</u>	<u>22-27</u>	<u>PREVALENCE</u>	<u>TOTAL</u>	<u>PREVALENCE</u>
	<u>RACE</u>						
Male	Caucasian	1	( .01)	1	( .05)	2	( .02)
	Black	3	( .20)	2	( .50)	5	( .26)
	Other	0	(0)	1	( .65)	1	( .16)
Total Male		4	( .03)	4	( .14)	8	( .06)
Female	Caucasian	2	( .14)	0	(0)	2	( .11)
	Black	1	( .30)	2	(1.45)	3	( .63)
	Other	1	(1.37)	0	(0)	1	(1.01)
Total Female		4	( .22)	2	( .34)	6	( .25)
Total Caucasian		3	( .03)	1	( .04)	4	( .03)
Total Black		4	( .21)	4	( .74)	8	( .33)
Total Other		1	( .18)	1	( .56)	2	( .27)
Total		8	( .06)	6	( .18)	14	( .08)

Sample Size    n = 14

Includes 3 patients not clinically examined.  
Panorex Only.

TABLE 14

## SAMPLE COMBINED TYPE III BY AGE, SEX, RACE AND PREVALENCE

		<u>AGE</u>	<u>17-21</u>	<u>PREVALENCE</u>	<u>22-27</u>	<u>PREVALENCE</u>	<u>TOTAL</u>	<u>PREVALENCE</u>
<u>SEX</u>	<u>RACE</u>							
Male	Caucasian	1	(.01)	4	(.18)	5	(.04)	
	Black	9	(.59)	7	(1.73)	16	(.83)	
	Other	0	(0)	0	(0)	0	(0)	
Total Male		10	(.09)	11	(.40)	21	(.15)	
Female	Caucasian	2	(.14)	0	(0)	2	(.11)	
	Black	0	(0)	0	(0)	2	(.42)	
	Other	0	(0)	0	(0)	0	(0)	
Total Female		2	(.11)	2	(.34)	4	(.17)	
Total Caucasian		3	(.03)	4	(.15)	7	(.05)	
Total Black		9	(.48)	9	(1.66)	18	(.75)	
Total Other		0	(0)	0	(0)	0	(0)	
Total		12	(.09)	13	(.39)	25	(.15)	

Sample Size    n = 25

TABLE 15

PLAQUE INDEX BY SURFACE (MESIAL, FACIAL, LINGUAL, DISTAL) ON  
AFFECTED AND UNAFFECTED SITES IN COMBINED TYPE II PATIENTS

<u>PLAQUE INDEX</u>	<u>0</u>	<u>%</u>	<u>1</u>	<u>%</u>	<u>2</u>	<u>%</u>	<u>3</u>	<u>%</u>	<u>TOTAL</u>	<u>%</u>
<u>SURFACE</u>										
<u>Mesial</u>										
Unaffected	12	( 5.2)	147	(63.1)	67	(28.8)	7	( 3.0)	233	(100)
Affected	4	( 4.8)	44	(53.0)	28	(33.7)	7	( 8.4)	83	(100)
Total Mesial	16	( 5.1)	191	(60.4)	95	(30.1)	14	( 4.4)	316	(100)
<u>Facial</u>										
Unaffected	158	(51.6)	85	(27.8)	56	(18.3)	7	( 2.3)	306	(100)
Affected	2	(20.0)	6	(60.0)	0	(0)	2	(20.0)	10	(100)
Total Facial	160	(50.6)	91	(28.8)	56	(17.7)	9	( 2.8)	316	(100)
<u>Lingual</u>										
Unaffected	73	(23.9)	170	(55.7)	57	(18.7)	5	( 1.6)	305	(100)
Affected	3	(27.3)	3	(27.3)	3	(27.3)	2	(18.2)	11	(100)
Total Lingual	76	(24.1)	173	(54.7)	60	(19.0)	7	( 2.2)	316	(100)
<u>Distal</u>										
Unaffected	14	( 6.0)	146	(62.7)	61	(26.2)	12	( 5.2)	233	(100)
Affected	3	( 3.6)	41	(49.4)	33	(39.8)	6	( 7.2)	83	(100)
Total Distal	17	( 5.4)	187	(59.2)	94	(29.7)	18	( 5.7)	316	(100)
Total	269	(21.3)	642	(50.8)	305	(24.1)	48	( 3.8)	1264	(100)

Sample Size n = 1264

Mesial Chi square = 5.62 p = 0.13  
 Facial Chi square = 17.90 p < 0.001  
 Lingual Chi square = 18.15 p < 0.001  
 Distal Chi square = 6.73 p = 0.08

index equal to 3. There was a significant difference between the plaque index for unaffected and affected sites on the facial and lingual surfaces; however, there was no significant difference between unaffected and affected sites on mesial and distal surfaces.

Table 16 shows the plaque index by site for Combined Type III patients. A higher percentage of the unaffected sites, compared to affected sites, on mesial, facial and distal surfaces exhibited a plaque index equal to 0 or 1. In contrast, a higher percentage of the affected sites, compared to unaffected sites, on mesial, facial and distal surfaces showed a plaque index equal to 2 or 3. There was a significant difference between the plaque index of unaffected and affected sites on the mesial, facial and distal surfaces. In contrast, there was no significant difference between the plaque index of unaffected and affected sites on the lingual surface.

The gingival index by site for Combined Type II patients is shown in Table 17. A higher percentage of unaffected sites, compared to affected sites, on all surfaces demonstrated a gingival index equal to 0, while a higher percentage of affected sites, compared to unaffected sites, on all surfaces had a gingival index equal to 2 or 3. There was a significant difference between the gingival index of unaffected and affected sites for all surfaces.

TABLE 16

PLAQUE INDEX BY SURFACE (MESIAL, FACIAL, LINGUAL, DISTAL) ON  
AFFECTED AND UNAFFECTED SITES IN COMBINED TYPE III PATIENTS

<u>PLAQUE INDEX</u>	<u>0</u>	<u>%</u>	<u>1</u>	<u>%</u>	<u>2</u>	<u>%</u>	<u>3</u>	<u>%</u>	<u>TOTAL</u>	<u>%</u>
<u>SURFACE</u>										
<u>Mesial</u>										
Unaffected	20 ( 7.8)		176 (68.2)		61 (23.6)		1 (0.4)		258	(100)
Affected	26 ( 5.8)		248 (55.1)		167 (32.1)		9 (2.0)		450	(100)
Total Mesial	46 ( 6.5)		424 (59.9)		228 (32.2)		10 (1.4)		708	(100)
<u>Facial</u>										
Unaffected	336 (52.6)		217 (34.0)		84 (13.1)		2 (0.3)		639	(100)
Affected	29 (42.6)		17 (29.0)		16 (23.5)		6 (8.8)		68	(100)
Total Facial	365 (51.6)		234 (33.1)		100 (14.1)		8 (1.1)		707	(100)
<u>Lingual</u>										
Unaffected	162 (26.1)		260 (58.1)		96 (15.5)		2 (0.3)		620	(100)
Affected	28 (31.8)		45 (51.1)		15 (17.0)		0 (0)		88	(100)
Total Lingual	190 (26.8)		405 (57.2)		111 (15.7)		2 (0.3)		708	(100)
<u>Distal</u>										
Unaffected	15 ( 6.0)		168 (66.7)		69 (27.4)		0 (0)		252	(100)
Affected	26 ( 5.7)		254 (55.7)		170 (37.3)		6 (1.3)		456	(100)
Total Distal	41 ( 5.8)		422 (59.6)		239 (33.8)		6 (0.8)		708	(100)
Total	642 (22.7)		1485 (52.5)		678 (23.9)		26 (0.9)		2831	(100)

Sample Size n = 2831

Mesial Chi square = 17.94 p < 0.001  
 Facial Chi square = 46.69 p < 0.001  
 Lingual Chi square = 1.98 p = 0.58  
 Distal Chi square = 11.32 p ≤ 0.01



TABLE 17

GINGIVAL INDEX BY SURFACE (MESIAL, FACIAL, LINGUAL, DISTAL) ON  
AFFECTED AND UNAFFECTED SITES IN COMBINED TYPE II PATIENTS

GINGIVAL INDEX	<u>0</u>	<u>%</u>	<u>1</u>	<u>%</u>	<u>2</u>	<u>%</u>	<u>3</u>	<u>%</u>	<u>TOTAL</u>	<u>%</u>
<u>SURFACE</u>										
<u>Mesial</u>										
Unaffected	38	(16.3)	87	(37.3)	108	(46.4)	0	(0)	233	(100)
Affected	3	( 3.6)	7	( 8.4)	70	(84.3)	3	( 3.6)	83	(100)
Total Mesial	41	(13.0)	94	(29.7)	178	(56.3)	3	( 0.9)	316	(100)
<u>Facial</u>										
Unaffected	194	(63.4)	93	(30.4)	19	( 6.2)	0	(0)	306	(100)
Affected	1	(10.0)	5	(50.0)	2	(20.0)	2	(20.0)	10	(100)
Total Facial	195	(61.7)	98	(31.0)	21	( 6.6)	2	( 0.6)	316	(100)
<u>Lingual</u>										
Unaffected	137	(44.9)	117	(38.4)	51	(16.7)	0	(0)	305	(100)
Affected	1	( 9.1)	4	(36.4)	3	(27.3)	3	( 0.9)	11	(100)
Total Lingual	138	(43.7)	121	(38.3)	54	(17.1)	3	( 0.9)	316	(100)
<u>Distal</u>										
Unaffected	31	(13.3)	99	(42.5)	103	(44.2)	0	(0)	233	(100)
Affected	1	( 1.2)	17	(20.5)	62	(74.7)	3	( 3.6)	83	(100)
Total Distal	32	(10.1)	116	(36.7)	165	(52.2)	3	( 0.9)	316	(100)
Total	406	(32.1)	429	(33.9)	418	(33.1)	11	( 0.9)	1264	(100)

Sample Size    n = 1264

Mesial Chi square = 48.89    p < 0.001  
 Facial Chi square = 69.65    p < 0.001  
 Lingual Chi square = 87.01    p < 0.001  
 Distal Chi square = 36.24    p < 0.001



Table 18 shows the gingival index by site for Combined Type III patients. In Type III patients a higher percentage of unaffected sites, compared to affected sites, exhibited a gingival index equal to 0 (for all surfaces) while a higher percentage of affected sites, compared to unaffected sites, on the mesial, facial and distal surfaces had a gingival index of 2 or 3. The lingual surface had no sites with a gingival index equal to 3, but the affected sites, compared to unaffected sites, demonstrated a higher percentage of gingival sites with a gingival index equal to 2. There was a significant difference in the gingival index between unaffected and affected sites for all surfaces.

A comparison of mean age, gingival index, plaque index and calculus index between Combined Type II and Combined Type III patients is shown in Table 19. No significant difference between the groups for any of these variables was seen.

#### H. Alveolar Bone Loss

Eighty-one percent (81%) of the mesial surfaces and 82.5% of the distal surfaces of all teeth in Combined Type II patients exhibited Type A bone loss (0-10%) (Table 20). Fifty point six percent (50.6%) of the affected mesial surfaces and 45.7% of the affected distal surfaces demonstrated Type B bone loss (20-40%). There was no significant difference in the

TABLE 18

GINGIVAL INDEX BY SURFACE (MESIAL, FACIAL, LINGUAL, DISTAL) ON  
AFFECTED AND UNAFFECTED SITES IN COMBINED TYPE III PATIENTS

<u>GINGIVAL INDEX</u>	<u>0</u>	<u>%</u>	<u>1</u>	<u>%</u>	<u>2</u>	<u>%</u>	<u>3</u>	<u>%</u>	<u>TOTAL</u>	<u>%</u>
<u>SURFACE</u>										
<u>Mesial</u>										
Unaffected	14	( 5.4)	105	(40.7)	137	(53.1)	2	(0.8)	258	(100)
Affected	9	( 2.0)	75	(16.7)	359	(79.8)	7	(1.6)	450	(100)
Total Mesial	23	( 3.2)	180	(25.4)	496	(70.1)	9	(1.3)	708	(100)
<u>Facial</u>										
Unaffected	389	(60.8)	166	(25.9)	84	(13.1)	1	(0.2)	640	(100)
Affected	20	(29.4)	19	(27.9)	28	(41.2)	1	(1.5)	68	(100)
Total Facial	409	(57.8)	185	(26.1)	112	(15.8)	2	(0.3)	708	(100)
<u>Lingual</u>										
Unaffected	250	(40.3)	249	(40.2)	121	(19.5)	0	(0)	620	(100)
Affected	14	(15.9)	26	(29.5)	48	(54.5)	0	(0)	88	(100)
Total Lingual	264	(37.3)	275	(38.8)	169	(23.9)	0	(0)	708	(100)
<u>Distal</u>										
Unaffected	13	( 5.2)	123	(48.8)	116	(46.0)	0	(0)	252	(100)
Affected	7	( 1.5)	102	(22.4)	342	(75.0)	5	(1.1)	456	(100)
Total Distal	20	( 2.8)	225	(31.8)	458	(64.7)	5	(0.7)	708	(100)
Total	716	(25.3)	865	(30.5)	1235	(43.6)	16	(0.6)	2832	(100)

Sample Size    n = 2832

Mesial Chi square    = 60.62    p < 0.001  
 Facial Chi square    = 44.90    p < 0.001  
 Lingual Chi square    = 54.17    p < 0.001  
 Distal Chi square    = 67.07    p < 0.001

TABLE 19

COMPARISON OF AGE, GINGIVAL INDEX, PLAQUE INDEX AND CALCULUS INDEX BETWEEN COMBINED TYPE II AND COMBINED TYPE III PATIENTS

<u>COMBINED TYPE</u>	<u>AGE</u>	
	<u>II</u>	<u>III</u>
Mean	21.2727	21.8400
Standard Deviation	2.2843	2.8821
Sample Size	11	25

T = 0.58      p = 0.5681

<u>GINGIVAL INDEX</u>		
Mean	1.0182	1.1824
Standard Deviation	0.2903	0.3574
Sample Size	11	25

T = 1.34      p = 0.1896

<u>PLAQUE INDEX</u>		
Mean	1.1200	1.0260
Standard Deviation	0.4422	0.3787
Sample Size	11	25

T = 0.65      p = 0.5187

<u>CALCULUS INDEX</u>		
Mean	0.6227	0.9672
Standard Deviation	0.4283	0.8353
Sample Size	11	25

T = 1.63      p = 0.1123

TABLE 20

EXTENT OF ROOT INVOLVEMENT ON MESIAL AND DISTAL SURFACES  
IN UNAFFECTED AND AFFECTED SITES, COMBINED TYPE II PATIENTS

<u>TYPE</u>	<u>A</u>	<u>%</u>	<u>B</u>	<u>%</u>	<u>C</u>	<u>%</u>	<u>D</u>	<u>%</u>	<u>TOTAL</u>	<u>%</u>
<u>SURFACE</u>										
<u>Mesial</u>										
Unaffected	227	(100)	0	(0)	0	(0)	0	(0)	227	(100)
Affected	24	(28.9)	42	(50.6)	10	(12.0)	7	(8.4)	83	(100)
Total Mesial	251	(81.0)	42	(13.5)	10	( 3.2)	7	(2.3)	310	(100)
<u>Distal</u>										
Unaffected	211	(100)	0	(0)	0	(0)	0	(0)	211	(100)
Affected	30	(37.0)	37	(45.7)	9	(11.1)	5	(6.2)	81	(100)
Total Distal	241	(82.5)	37	(12.7)	9	( 3.1)	5	(1.7)	292	(100)
Total	492	(81.7)	79	(13.1)	19	( 3.2)	12	(2.0)	602	(100)

Sample Size    n = 602

Mesial Chi square = 199.29    p < 0.001

Distal Chi square = 160.97    p < 0.001

Mesial VS Distal Chi square = 1.35    p = 0.72

distribution of Type A, B, C or D bone loss between mesial and distal surfaces of teeth in Combined Type II cases.

The average percent of bone loss by tooth and surface for Combined Type II patients is shown in Figure 9. The most severely affected teeth were first molars, followed by central incisors. A comparison of the average percentage of bone loss, maxillary versus mandibular arches (Table 21), showed no significant difference between arches for either mesial or distal tooth surfaces. For tooth surfaces with bone loss in Combined Type II cases, 77.3% exhibited horizontal bone loss and 22.7% demonstrated angular bone loss (Table 22). A significant difference was seen on the distal surface where 26.0% of the affected surfaces showed angular bone loss and only 6.7% of the unaffected surfaces (< 20% bone loss) demonstrated angular bone loss. There was no significant difference between affected and unaffected mesial surfaces. There was no significant difference in the distribution of angular and horizontal bone loss between affected mesial and distal surfaces of teeth in Combined Type II patients.

In the Combined Type III patients, 49.1% of the mesial surfaces and 47.3% of the distal surfaces of teeth exhibited Type A bone loss (0-10%) (Table 23). Type B bone loss (20-40%) was associated with 68.8% of the affected mesial and 67.7% of the affected distal tooth surfaces. There was no significant difference in the distribution of Type A, B, C or



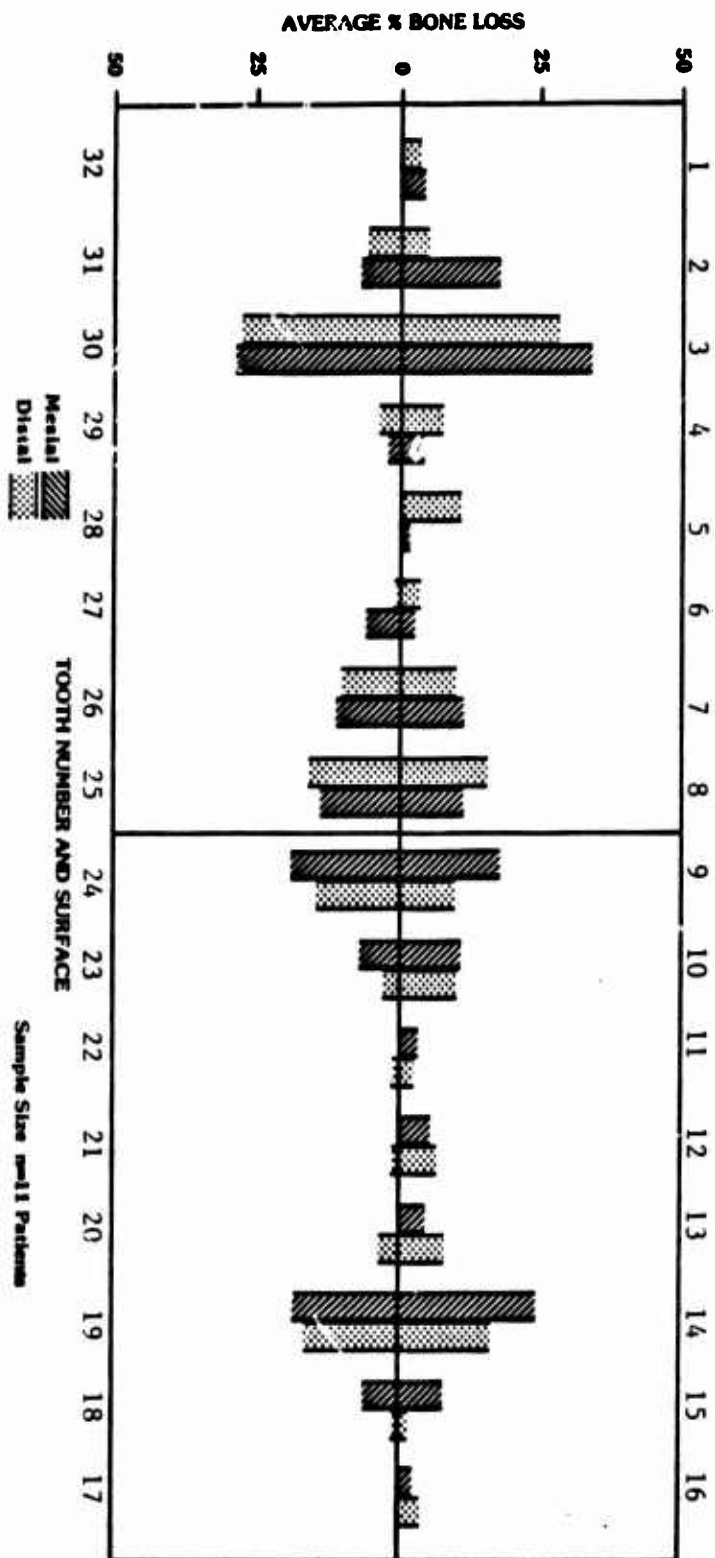


TABLE 21

COMPARISON OF AVERAGE PERCENTAGE OF BONE LOSS ON MESIAL  
AND DISTAL SURFACES OF COMBINED TYPE II PATIENTS  
MAXILLARY VERSUS MANDIBULAR

<u>TEETH</u>		<u>MAXILLARY</u>	<u>MANDIBULAR</u>
<u>SURFACE</u>			
Mesial	Mean	10.74	7.76
	Standard Deviation	17.22	18.72
		T = 1.46	p = 0.145
Distal	Mean	9.59	7.35
	Standard Deviation	16.32	16.85
		T = 1.15	p = 0.250



TABLE 22

## ANGULAR VERSUS HORIZONTAL BONE LOSS

(MESIAL AND DISTAL SURFACES)

ON AFFECTED AND UNAFFECTED TEETH IN COMBINED TYPE II PATIENTS

<u>TYPE OF BONE LOSS</u>		<u>ANGULAR</u>	<u>%</u>	<u>HORIZONTAL</u>	<u>%</u>	<u>TOTAL</u>	<u>%</u>
<u>SURFACE</u>							
Mesial	Unaffected	5	(15.6)	27	(84.4)	32	(100)
	Affected	22	(28.6)	55	(71.4)	77	(100)
	Total Mesial	27	(24.8)	82	(75.2)	109	(100)
Distal	Unaffected	2	( 6.7)	28	(93.3)	30	(100)
	Affected	20	(26.0)	57	(74.0)	77	(100)
	Total Distal	22	(20.6)	85	(79.4)	107	(100)
Total		49	(22.7)	167	(77.3)	216	(100)

Sample Size    n = 216

Mesial Chi square = 1.40    p = .24

Distal Chi square = 3.82    p = .05

Mesial VS Distal Affected Teeth

Chi square = 0.03    p = .86

TABLE 23

EXTENT OF ROOT INVOLVEMENT ON MESIAL AND DISTAL SURFACES IN  
UNAFFECTED AND AFFECTED SITES, COMBINED TYPE III PATIENTS

<u>TYPE</u>	<u>A</u>	<u>%</u>	<u>B</u>	<u>%</u>	<u>C</u>	<u>%</u>	<u>D</u>	<u>%</u>	<u>TOTAL</u>	<u>%</u>
<u>SURFACE</u>										
<u>Mesial</u>										
Unaffected	246	(100)	0	(0)	0	(0)	0	(0)	246	(100)
Affected	95	(21.2)	308	(68.8)	40	(8.9)	5	(1.1)	448	(100)
Total Mesial	341	(49.1)	308	(44.4)	40	(5.8)	5	(0.7)	694	(100)
<u>Distal</u>										
Unaffected	206	(100)	0	(0)	0	(0)	0	(0)	206	(100)
Affected	96	(22.2)	293	(67.7)	39	(9.0)	5	(1.2)	433	(100)
Total Distal	302	(47.3)	293	(45.9)	39	(6.1)	5	(0.8)	639	(100)
Total	643	(48.2)	601	(45.1)	79	(5.9)	10	(0.8)	1333	(100)

Sample Size n = 1333

Mesial Chi square = 394.45 p < 0.001

Distal Chi square = 339.24 p < 0.001

Mesial VS Distal Chi square = .14 p = 0.99

D bone loss between affected mesial and distal tooth surfaces in Combined Type III patients.

Figure 10 illustrates the average percentage (severity) of bone loss by tooth and surface for Combined Type III patients. The most severely affected teeth were the first molars, followed by central incisors. Mesial surfaces exhibited a significantly higher percentage of bone loss in the maxillary arch compared to the mandibular arch (Table 24). No significant difference was seen between the arches for the distal surfaces of teeth. In Combined Type III cases, 84.5% of the teeth with bone loss exhibited horizontal bone loss and 15.5% angular bone loss (Table 25). A significant difference was seen on the mesial surface, where 17.2% of the affected sites showed angular bone loss as compared to 5.4% of the unaffected sites (< 20% bone loss). On the distal surface, 16.6% of the affected sites showed angular bone loss, while only 2.0% of the unaffected sites (< 20% bone loss) demonstrated angular bone loss. The latter finding was statistically significant. There was no significant difference in the distribution of angular and horizontal bone loss between the mesial and distal surfaces of teeth with bone loss in Combined Type III patients.

A comparison of the average percentage of bone loss between Combined Type II and Combined Type III cases is shown in Table 26. Combined Type III patients had twice the average percentage of bone loss on mesial and distal surfaces in both

Figure 10. The average percentage of bone loss (severity) by tooth and surface in Combined Type III patients.

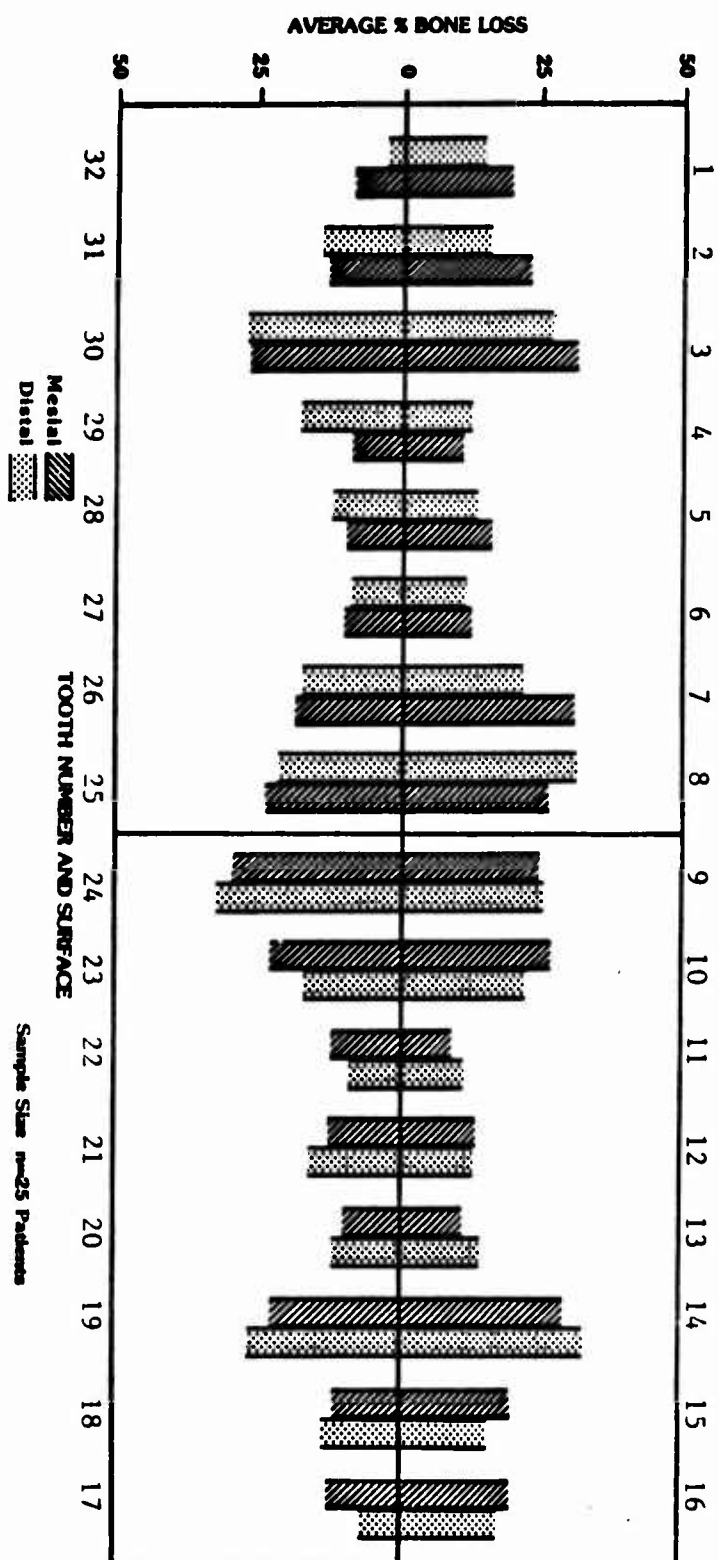


TABLE 24  
COMPARISON OF AVERAGE PERCENTAGE OF BONE LOSS ON MESIAL  
AND DISTAL SURFACES OF COMBINED TYPE III PATIENTS  
MAXILLARY VERSUS MANDIBULAR

<u>TEETH</u>		<u>MAXILLARY</u>	<u>MANDIBULAR</u>
<u>SURFACE</u>			
Mesial	Mean	20.40	16.34
	Standard Deviation	16.62	16.57
		T = 3.23	p = 0.001
Distal	Mean	19.54	17.67
	Standard Deviation	15.36	17.22
		T = 1.45	p = 0.146

TABLE 25

## ANGULAR VERSUS HORIZONTAL BONE LOSS

(MESIAL AND DISTAL SURFACES)

ON AFFECTED AND UNAFFECTED TEETH IN COMBINED TYPE III PATIENTS

<u>TYPE OF BONE LOSS</u>		<u>ANGULAR</u>	<u>%</u>	<u>HORIZONTAL</u>	<u>%</u>	<u>TOTAL</u>	<u>%</u>
<u>SURFACE</u>							
Mesial	Unaffected	3	( 5.4)	53	(94.6)	56	(100)
	Affected	80	(17.2)	386	(82.8)	466	(100)
	Total Mesial	83	(15.9)	439	(84.1)	522	(100)
Distal	Unaffected	1	( 2.0)	48	(98.0)	49	(100)
	Affected	73	(16.6)	368	(83.4)	441	(100)
	Total Distal	74	(15.1)	416	(84.9)	490	(100)
Total		157	(15.5)	855	(84.5)	1012	(100)

Sample Size    n = 1012

Mesial Chi square = 4.36    p = .04

Distal Chi square = 6.16    p = .01

Mesial VS Distal Affected Teeth

Chi square = 0.03    p = .87



TABLE 26

COMPARISON OF AVERAGE PERCENTAGE OF BONE LOSS  
ON MESIAL AND DISTAL SURFACES  
COMBINED GROUP II VERSUS COMBINED GROUP III

<u>TEETH</u>	<u>SURFACE</u>	<u>COMBINED GROUP</u>	<u>II</u>	<u>III</u>
Maxillary	Mesial	Mean	10.74	20.40
		Standard Deviation	17.22	16.62
		T =	5.86	p < 0.001
	Distal	Mean	9.58	19.54
		Standard Deviation	16.32	15.36
		T =	6.21	p < 0.001
Mandibular	Mesial	Mean	7.76	16.34
		Standard Deviation	18.72	16.57
		T =	4.92	p < 0.001
	Distal	Mean	7.35	17.67
		Standard Deviation	16.85	17.22
		T =	6.09	p < 0.001
Maxillary and Mandibular	Mesial	Mean	9.24	18.37
		Standard Deviation	18.02	16.70
	Distal	Mean	8.46	18.61
		Standard Deviation	16.60	16.32
		T =	8.70	p < 0.001



the maxillary and mandibular arches compared to Combined Type II patients. This was statistically significant.

Twenty-two of the 44 patients in this study demonstrated radiographic evidence of symmetrical bone loss between right and left sides of the mouth. In the localized juvenile periodontitis group, 3 of the 5 patients had symmetrical bone loss. Of the intermediate juvenile periodontitis group, 5 of 14 were judged to be symmetrical. In the generalized juvenile periodontitis patients, 14 of the 25 cases demonstrated symmetrical bone loss.

#### I. Bleeding on Probing

In Combined Type II cases, a significantly higher percentage of the affected sites demonstrated bleeding on probing than unaffected sites for all surfaces (Table 27). Of the affected sites, 43.3% demonstrated bleeding on probing, while only 11.8% of the unaffected sites exhibited bleeding on probing.

A comparison of bleeding on probing of mesial, facial, lingual and distal surfaces in affected and unaffected sites in Combined Type III patients is shown in Table 28. A significantly higher percentage of the affected sites, on all surfaces, bled on probing compared to unaffected sites. Of the affected sites, 36.0% demonstrated bleeding on probing compared to 13.4% of the unaffected sites.

TABLE 27

## BLEEDING ON PROBING BY SURFACE

(MESIAL, FACIAL, LINGUAL, DISTAL)

IN AFFECTED AND UNAFFECTED SITES IN COMBINED TYPE II PATIENTS

<u>BLEEDING ON PROBING</u>		<u>PRESENT</u>	<u>%</u>	<u>ABSENT</u>	<u>%</u>	<u>TOTAL</u>	<u>%</u>
<u>SURFACE</u>							
Mesial	Unaffected	40	(17.2)	193	(82.8)	233	(100)
	Affected	37	(44.6)	46	(55.4)	83	(100)
	Total Mesial	77	(24.4)	239	(75.6)	316	(100)
Facial	Unaffected	14	( 4.6)	292	(95.4)	306	(100)
	Affected	4	(40.0)	6	(60.0)	10	(100)
	Total Facial	18	( 5.7)	298	(94.3)	316	(100)
Lingual	Unaffected	40	(13.1)	265	(86.9)	305	(100)
	Affected	7	(63.6)	4	(36.4)	11	(100)
	Total Lingual	47	(14.9)	269	(85.1)	316	(100)
Distal	Unaffected	33	(14.2)	200	(85.8)	233	(100)
	Affected	33	(39.8)	50	(60.2)	83	(100)
	Total Distal	66	(20.9)	250	(79.1)	316	(100)
Total		208	(16.5)	1056	(83.5)	1264	(100)

Sample Size    n = 1264

Mesial Chi square = 24.95    p &lt; 0.001

Facial Chi square = 22.62    p &lt; 0.001

Lingual Chi square = 21.40    p &lt; 0.001

Distal Chi square = 24.27    p &lt; 0.001

TABLE 28

BLEEDING ON PROBING BY SURFACE  
(MESIAL, FACIAL, LINGUAL, DISTAL)  
IN AFFECTED AND UNAFFECTED SITES IN COMBINED TYPE III PATIENTS

<u>BLEEDING ON PROBING</u>		<u>PRESENT</u>	<u>%</u>	<u>ABSENT</u>	<u>%</u>	<u>TOTAL</u>	<u>%</u>
<u>SURFACE</u>							
Mesial	Unaffected	37	(14.3)	221	(85.7)	258	(100)
	Affected	164	(36.4)	286	(63.6)	450	(100)
	Total Mesial	201	(28.4)	507	(71.6)	708	(100)
Facial	Unaffected	68	(10.6)	572	(89.4)	640	(100)
	Affected	21	(30.9)	47	(69.1)	68	(100)
	Total Facial	89	(12.6)	619	(87.4)	708	(100)
Lingual	Unaffected	102	(16.5)	518	(83.5)	620	(100)
	Affected	41	(46.6)	47	(53.4)	88	(100)
	Total Lingual	143	(20.2)	565	(79.8)	708	(100)
Distal	Unaffected	30	(11.9)	222	(88.1)	252	(100)
	Affected	156	(34.2)	300	(65.8)	456	(100)
	Total Distal	186	(26.3)	522	(73.7)	708	(100)
Total		619	(21.9)	2213	(78.1)	2832	(100)

Sample Size    n = 2832

Mesial Chi square = 39.41    p < 0.001  
 Facial Chi square = 22.95    p < 0.001  
 Lingual Chi square = 43.43    p < 0.001  
 Distal Chi square = 41.69    p < 0.001

### J. Mobility

Affected teeth in Combined Type II cases exhibited significantly greater mobility compared to unaffected teeth (Table 29). For unaffected teeth, 99.5% demonstrated no mobility, while 1 tooth (0.5%) exhibited a mobility of I. For affected teeth, 83.6% exhibited no mobility, 12 teeth (9.8%) a mobility of I, 2 teeth (1.6%) a mobility of II and 6 teeth (4.9%) had a mobility of III. Of all the teeth in this group, 93.3% exhibited no mobility.

Affected teeth in Combined Type III patients also showed a significantly higher mobility than unaffected teeth (Table 30). Most of the unaffected teeth (94.8%) in Combined Type III patients showed no mobility, with 8 teeth (5.2%) exhibiting a mobility of I. For affected teeth, 85.0% demonstrated no mobility, 70 teeth (12.7%) a mobility of I, 10 teeth (1.4%) a mobility of II and 3 teeth (0.4%) demonstrated a mobility of III. Of all the teeth in this group, 87.1% exhibited no mobility.

### K. Furcation Invasion

In Combined Type II patients, a significantly higher percentage of affected molar teeth demonstrated radiographic evidence of furcation invasion than unaffected molar teeth (Table 31). None of the unaffected teeth in this group exhibited radiographic evidence of furcation invasion, while it was evident in 18.2% of the affected molar teeth.

TABLE 29

DISTRIBUTION OF MOBILITY IN COMBINED TYPE II PATIENTS  
BY UNAFFECTED AND AFFECTED TEETH

<u>MOBILITY</u>	<u>0</u>	<u>%</u>	<u>I</u>	<u>%</u>	<u>II</u>	<u>%</u>	<u>III</u>	<u>%</u>	<u>TOTAL</u>	<u>%</u>
Unaffected Teeth	192	(99.5)	1	(0.5)	0	(0)	0	(0)	193	(100)
Affected Teeth	102	(83.6)	12	(9.8)	2	(1.6)	6	(4.9)	122	(100)
Total	294	(93.3)	13	(4.1)	2	(0.6)	6	(1.9)	315	(100)

Sample Size     $n = 315$

Chi square = 30.40     $p < 0.001$

TABLE 30

DISTRIBUTION OF MOBILITY IN COMBINED TYPE III PATIENTS  
BY UNAFFECTED AND AFFECTED TEETH

<u>MOBILITY</u>	<u>0</u>	<u>%</u>	<u>I</u>	<u>%</u>	<u>II</u>	<u>%</u>	<u>III</u>	<u>%</u>	<u>TOTAL</u>	<u>%</u>
Unaffected Teeth	147	(94.8)	8	( 5.2)	0	(0)	0	(0)	155	(100)
Affected Teeth	470	(85.0)	70	(12.7)	10	(1.8)	3	(0.5)	553	(100)
Total	617	(87.1)	78	(11.0)	10	(1.4)	3	(0.4)	708	(100)

Sample Size    n = 708

Chi square = 11.167    p = 0.0109

TABLE 31

DISTRIBUTION OF RADIOGRAPHIC EVIDENCE OF  
FURCATION INVASION (FI) IN COMBINED TYPE II PATIENTS  
BY AFFECTED AND UNAFFECTED MOLAR TEETH

<u>FI</u>	<u>PRESENT</u>	<u>%</u>	<u>ABSENT</u>	<u>%</u>	<u>TOTAL</u>	<u>%</u>
Unaffected teeth	0	(0)	36	(100)	36	(100)
Affected teeth	12	(18.2)	54	(81.8)	66	(100)
Total	12	(11.8)	90	(88.2)	102	(100)

Sample Size    n = 102

Fisher Exact Test (2-Tail)    p < 0.001



A comparison of radiographic evidence of furcation invasion in Combined Type III cases is shown in Table 32. Although none of the 14 unaffected molar teeth demonstrated furcation invasion and 42 of the 203 affected molar teeth did show furcation invasion, this was not statistically significant because of the small number of unaffected teeth in this group.

L. Balancing Interferences

While only 17 (1.7%) of 1024 teeth in this study (all patients) demonstrated balancing interferences (Table 33), 16 of these were on affected teeth. This was statistically significant.



TABLE 32

DISTRIBUTION OF RADIOGRAPHIC EVIDENCE OF  
FURCATION INVASION (FI) IN COMBINED TYPE III PATIENTS  
BY AFFECTED AND UNAFFECTED MOLAR TEETH

<u>FI</u>	<u>PRESENT</u>	<u>%</u>	<u>ABSENT</u>	<u>%</u>	<u>TOTAL</u>	<u>%</u>
Unaffected teeth	0	(0)	14	(100)	14	(100)
Affected teeth	42	(20.7)	161	(79.3)	203	(100)
Total	42	(19.4)	175	(80.6)	217	(100)

Sample Size     $n = 217$

Fisher Exact Test (2-Tail)     $p = 0.08$

TABLE 33

DISTRIBUTION OF BALANCING INTERFERENCES  
ON UNAFFECTED AND AFFECTED TEETH

<u>BALANCING INTERFERENCES</u>	<u>PRESENT</u>	<u>%</u>	<u>ABSENT</u>	<u>%</u>	<u>TOTAL</u>	<u>%</u>
Unaffected teeth	1	(.3)	347	(99.7)	348	(100)
Affected teeth	16	(2.4)	660	(97.6)	676	(100)
Total	17	(1.7)	1007	(98.3)	1024	(100)

Sample Size     $n = 1024$

Chi square = 4.88     $p = 0.03$

## V. DISCUSSION

### A. Population, Sample and Prevalence

Panoramic radiographs were chosen to screen the population for evidence of alveolar bone loss. This method was chosen for this study because panoramic radiographs are routinely exposed and interpreted on all incoming basic trainees at Lackland AFB, Texas, and they have been shown to be a reliable screening tool. (Davies et al., 1977) The screening method chosen was not felt to influence the results of this study. In fact, 7 of the patients initially invited to participate in this study subsequently were diagnosed as having little or no alveolar bone loss ( $< 20\%$ ) or isolated areas of involvement with a history of trauma. This attests to the efficacy of the screening method chosen.

No comparison was done between the population used in this study and the general population. The only information available on the population was age, sex, race and place of enlistment. No information was available on socioeconomic group, education and dental I.Q.; and no radiographs for historical documentation were available. Hence, the results of this study need to be interpreted with these limitations in mind.

The overall prevalence of alveolar bone loss in this study was .26%. This is in agreement with Hew and Killoy (1979), who reported in their study of U.S. Air Force recruits

a prevalence of .255%. It is slightly higher than the prevalence of .15% reported by Kaslick and Chasens (1968) in U.S. Army recruits. However, Kaslick and Chasens (1968) felt they may have underestimated the prevalence in their study, because they looked at only mobility as an initial method for screening. In this study, mobility was a late finding, being evident only after extensive bone loss had occurred. It is also slightly lower than the .4% reported by Lacy and Brasher (1977) in U.S. Army recruits. The difference in prevalence found in this study and the latter study may be due to differences in populations studied. There was no information available on age, sex or race in the population studies by Lacy and Brasher (1977), so no comparison can be made with the population in the present study. Saxen (1980b) examined 8,096 Caucasian 16 year olds from Finland and reported a prevalence of 0.1%. The difference in the latter study and the present one can be accounted for. First, the latter studied a younger age group. It is possible that juvenile periodontitis may have begun in some of the patients in this group, but may not be clinically detectable by age 16 years. Second, the latter study eliminated 6 patients because they demonstrated excessive amounts of local irritants. The author is not clear on what she considers an excessive amount and studies, including this one, have shown more local irritants on teeth affected with juvenile periodontitis than unaffected teeth.

Third, the population studied was totally Caucasian. The present study shows a higher prevalence in Blacks than in Caucasians.

Kaslick and Chasens (1968) and Lacy and Brasher (1977) hypothesized that there might be a geographic difference in the prevalence of juvenile periodontitis for different areas of the United States. Both groups noticed a greater number of juvenile periodontitis cases in young adults from the Southwest. However, in both studies, no demographic information was available for the populations studied. The findings in this study suggest that there was no significant difference in prevalence among 7 geographic areas of the United States. The findings in this study, however, only reflect the population at the time of enlistment. No demographic information was available on the study population for times when possible contributory factors might be influential, such as birth, eruption of first molars, exfoliation of deciduous molars or onset of puberty.

#### B. Sex and Race

The population studied (young military recruits) is not representative of the total population or representative of the general population of similar age. The population studied (Table 5) was predominantly Caucasian (81.1%), male (85.7%) and less than 22 years of age (80.0%). It would not be meaningful to directly compare sex and race findings in

this study with results reported in other studies. To compensate for this problem, the prevalences of juvenile periodontitis for race and sex groups found in this study were compared to other studies.

Juvenile periodontitis has been seen more frequently in females than males (Table 4). The female to male ratio for the prevalence of juvenile periodontitis of 2.32/1 found in this study is in agreement with that reported by other authors. (Benjamin and Baer, 1967; Baer and Benjamin, 1974; Melnick et al., 1976; Manson, 1977; Hormand and Frandsen, 1979 and Burmeister et al., 1984) However, it is higher than the ratio of 1.05/1 reported by Hew and Killoy (1978). The higher female to male ratio for prevalence found in this study may reflect a change in the military female population between 1978 and the present time. This study, however, is in agreement with Hew and Killoy (1978), who reported a Black female to male ratio of 1.05/1 and a Caucasian female to male ratio of 1.19/1. Within racial groups this study found no significant difference between sexes or the prevalence of juvenile periodontitis for either Blacks or Caucasians.

Several studies have shown an increased prevalence of juvenile periodontitis in Blacks (Table 2). Previously reported ratios ranged from about 1/1 (Russell, 1957) to 8/1 (Kaslick and Chasens, 1968). The Black to Caucasian ratio for prevalence in this study was 16.13/1, higher than previously



reported. The higher ratio found in this study is probably due to differences in populations.

### C. Radiographic, Clinical and Combined Type Patients

Combining Radiographic and Clinical Type patients into Combined Type patients caused the Type I (localized juvenile periodontitis) patients to disappear in the sample population. This is not surprising considering the age of the population sampled (17-21 years). Horman and Frandsen (1979) reported that generalized juvenile periodontitis (Type III) was not found in 12-18 year olds, but 35% of the 26-32 year olds in their study with bone loss had generalized involvement. They speculated that initially there was localized involvement followed by involvement of other teeth. In this study, 63% of the patients, 17-21 years old, had generalized juvenile periodontitis (Type III) compared to 76% of the patients, 22-27 years of age. Since Horman and Frandsen (1979) looked at radiographs only, this can be compared to the Radiographic groups in this study. In this study the distribution of Radiographic Types by age was: for 17-21 year olds; Type I - 19%, Type II - 48% and Type III - 33%; for 22-27 year olds; Type I - 14%, Type II - 38% and Type III - 48%. The percentage of Radiographic Type I and II cases decreased with age, while the percentage of Type III patients increased with age.

In a recent study, Saxen and Murtomaa (1985), using the same age groups and type of localization of bone loss as Horman and Frandsen (1979), reported that, in patients with juvenile periodontitis aged 13-18 years, 66% demonstrated Type I and 16% demonstrated Type III involvement, while in patients aged 26-30 years, 5% showed Type I and 68% exhibited Type III involvement. The authors concluded that "juvenile periodontitis is one disease entity. It starts with bone destruction localized to first molars and/or incisors and develops, if not treated, to a more generalized form of the disease." This study lends support to this conclusion.

#### D. Effect of Age

In this study the percentage of teeth affected increased with age. In addition, the percentage of the population (prevalence) with Combined Type II (intermediate juvenile periodontitis) and Combined Type III (generalized juvenile periodontitis) involvement increased with age. This supports the hypothesis that in juvenile periodontitis more teeth become involved with age. (Horman and Frandsen, 1979; Saxen and Murtomaa, 1985) There is a possibility that some patients in this study may have coincidentally had, at the time of the study, adult periodontitis. No data for direct age group comparison is available. However, an examination of Table 20 and Table 23 shows that the majority of the affected sites had alveolar bone loss of Type B (20-40%) or more. It



seems unlikely that adult periodontitis, being an insidious chronic disease, could be responsible for the severe bone loss seen in these young adults.

Juvenile periodontitis lesions have been reported to spontaneously become inactive, or another form of periodontitis may become superimposed. This clinical feature has been called "burnout" and was discussed by Waldrop (1984). It is impossible to evaluate this feature in a cross-sectional study of this type.

#### E. Plaque Index and Gingival Index

Historically, juvenile periodontitis has been described as being associated with minimal amounts of bacterial plaque and the amount of plaque not being commensurate with the amount of destruction present. (Baer, 1971; Baer and Benjamin, 1974; Manson, 1973; Manouchehr-Pour, 1979; Page and Schroeder, 1982 and Cogen, 1984) In this study a higher plaque index was found for affected sites compared to unaffected sites. This finding agrees with the results shown by Burmeister et al. (1984).

In addition, juvenile periodontitis patients have been described as having normal appearing gingiva. (Gottlieb, 1923; Thoma and Goldman, 1940; Tenenbaum, 1950 and Manson, 1973) A higher gingival index was found in this study for affected sites compared to unaffected sites. This agrees with the results shown by Burmeister et al. (1984).

On the basis of this study, one cannot rule out that minimal amounts of plaque and gingival inflammation may be findings in localized juvenile periodontitis. However, in this study, plaque and gingival inflammation were associated with intermediate and generalized juvenile periodontitis. This lends support to the hypothesis that bacterial plaque is the primary etiologic factor in juvenile periodontitis.

#### F. Alveolar Bone Loss

Juvenile periodontitis has been described as a molar-incisor disease and, in most reported cases of generalized juvenile periodontitis, the permanent first molars and incisors remain the most severely affected teeth. (Wannenmacher, 1938; Miller, 1941; Kaslick and Chasens, 1968; Baer, 1971; Baer and Benjamin, 1974; Hormand and Frandsen, 1979; Newman, 1981 and Burmeister et al., 1984) In both intermediate juvenile periodontitis and generalized juvenile periodontitis patients in this study, the most frequently and severely involved teeth were the first molars and central incisors. This lends support to the hypothesis that in juvenile periodontitis initial involvement includes first molars and incisors, with subsequent involvement of other teeth, and agrees with the results of Hormand and Frandsen (1979), Saxen (1980b) and Burmeister et al. (1984).

Three of the patients in this study (prevalence .02%) did not show increased involvement of first molars and incisors. These patients may have had rapidly progressive periodontitis. (Page et al., 1983)

The classic radiographic molar lesion has been described as vertical in nature, with the incisor bone loss being horizontal in nature due to lack of alveolar bone mass. (Yount, 1956; Baer, 1971; Baer and Benjamin, 1974; Manouchehr-Pour and Bissada, 1979 and Waldrop, 1984) This study reported a decrease in the percentage of affected teeth with angular bone loss from 26.0% in intermediate juvenile periodontitis cases to 15.5% in generalized juvenile periodontitis patients. This finding also suggests that bone loss may begin as angular but becomes more horizontal in nature with increased severity. The findings in this study may also reflect that the 3 patients with rapidly progressive periodontitis demonstrated horizontal bone loss.

The radiographic lesions in juvenile periodontitis have been frequently described as symmetrical or mirror image in pattern. (Kaslick and Chasens, 1968; Baer, 1971; Baer and Benjamin, 1974; Manson, 1977; Hormand and Frandsen, 1979; Newman, 1981; Page and Schroeder, 1982 and Burmeister et al., 1984) Of the 44 patients in this study, 22 (50%) demonstrated radiographic symmetry (mirror image pattern).

Generalized juvenile periodontitis patients (mean age 21.84 years) in this study had twice the average percentage of

bone loss on mesial and distal surfaces in both the maxillary and mandibular arches as patients with intermediate juvenile periodontitis (mean age 21.27 years). Since the average age was not statistically different, this appears to reflect a more rapid loss of alveolar bone in generalized juvenile periodontitis patients.

#### G. Bleeding on Probing

"Bleeding on probing has been shown to be indicative of an inflammatory lesion in connective tissue adjacent to junctional epithelium which is characterized by collagen degradation, reduction of epithelium adjacent to the tooth surface and an influx of inflammatory cells." (Greenstein, 1985) Juvenile periodontitis patients have frequently been described as having no clinical signs of inflammation or bleeding on probing. (Manson, 1973 and Manouchehr-Pour, 1979) Other authors have disagreed, stating that inflammation and bleeding on probing were early signs of juvenile periodontitis. (Wannenmacher, 1938; Russell, 1967 and Burmeister et al., 1984) Authors agree that there appears to be an increase in inflammation, plaque and bleeding on probing in patients with generalized juvenile periodontitis. (Ranney et al., 1981a; Page and Schroeder, 1982; Page et al., 1983 and Burmeister et al., 1984)

Affected sites in intermediate and generalized juvenile periodontitis patients in this study demonstrated

bleeding on probing (intermediate juvenile periodontitis - 43.3%, generalized juvenile periodontitis - 36.1%) more frequently than unaffected sites (intermediate juvenile periodontitis - 11.8%, generalized juvenile periodontitis - 13.4%). Although, on the basis of this study, one cannot rule out that bleeding on probing may be an uncommon finding in localized juvenile periodontitis, it does agree with the results reported by Burmeister et al. (1984) and lends support to the theory that more inflammation is present in affected sites in patients with intermediate and generalized juvenile periodontitis.

#### H. Mobility

Loosening and pathologic migration of the teeth have been considered early findings in juvenile periodontitis patients. (Gottlieb, 1923; Thoma and Goldman, 1939, 1940 and Tenenbaum, 1950) In contrast, Newman (1981) suggested that mobility was a late finding in juvenile periodontitis, following extensive bone loss. In this study, there was an increase in mobility in affected teeth in intermediate and generalized juvenile periodontitis patients as compared to unaffected teeth. However, since 91.5% of the affected teeth in this study demonstrated no mobility, it is felt that this is a coincidental finding and probably reflects the severity of the bone loss in these patients. On the basis of this study, mobility cannot be considered one of the early signs

of juvenile periodontitis. However, when mobility is present, severe bone loss should be suspected.

#### I. Furcation Invasion

Clinically, furcation invasion is an unusual finding in juvenile periodontitis. Mesial and distal tooth surfaces are usually the most severely affected, with furcations being involved only in advanced disease or when bone loss occurs in a generalized horizontal pattern. (Waldrop, 1984) None of the unaffected and only 20% of the affected molars in this study demonstrated radiographic evidence of furcation invasion. Since, by definition, an unaffected tooth precluded furcation invasion (< 20% bone loss), this finding is not surprising. The small number of affected molars (20%) that exhibited radiographic furcation invasion within this study is probably a low figure. No attempt at clinical diagnosis of furcation invasion was made.

#### J. Balancing Interferences

Prichard (1965) suggested that the early clinical signs of juvenile periodontitis (loosening and wandering of teeth and angular bone loss) were the result of occlusal traumatism. If this hypothesis were true, balancing interferences and mobility should be common findings associated with affected teeth. However, balancing interferences were an uncommon finding in this study,



being found in only 17 (1.7%) of 1024 teeth. In addition, vertical type bone loss was not associated with balancing interferences in this study. While only 17 teeth exhibited balancing interferences, 206 teeth demonstrated vertical type bone loss. In some cases occlusal trauma may be a secondary factor in the etiology of the bone loss; but, in these patients, it is not a primary factor.

K. Limitations

The limitations or deficiencies of this study include: no information was available for comparison between the population studied and the general population; use of clinical probing depth instead of attachment loss measurements; a younger age group was not available (11-16 years) for examination; radiographs were not available to document the time of onset of disease and furcation invasion was not diagnosed clinically. It is felt that these limitations did not significantly detract from the results of this study. However, the results need to be interpreted with these limitations in mind.

## VI. SUMMARY

Forty-four out of 16,658 U.S. Air Force basic trainees, aged 17-27 years, were identified as having alveolar bone loss consistent with a diagnosis of juvenile periodontitis. The overall prevalence was .26%. The prevalence of localized juvenile periodontitis was .03%, for intermediate juvenile periodontitis .08% and for generalized juvenile periodontitis .15%. There was no difference in the prevalence between 7 geographic areas of the United States.

There was a female to male ratio for prevalence of 2.32/1, a Black to Caucasian prevalence ratio of 16.13/1, a Black male to Caucasian male prevalence ratio of 20.67/1 and a Black female to Caucasian female ratio for prevalence of 6.68/1. Within racial groups, no significant difference was found between the Black female to Black male prevalence ratio or the Caucasian female to Caucasian male prevalence ratio.

The most frequently and severely affected teeth were the first molars, followed by the incisors. The least frequently and severely affected teeth were the cuspids. There was no difference in bone loss between maxillary and mandibular arches. Fifty percent of the patients showed symmetry or mirror image type bone loss between the right and left sides of the mouth. The percentage of teeth affected and the percentage of the population affected increased with age.



There was twice as much bone loss on affected teeth in generalized juvenile periodontitis patients as those with intermediate juvenile periodontitis. The majority of the patients in both groups exhibited horizontal type bone loss. However, the percentage of angular bone loss was higher in patients with intermediate juvenile periodontitis compared to patients with generalized juvenile periodontitis.

The affected teeth in both the intermediate and generalized juvenile periodontitis groups demonstrated more plaque, inflammation and bleeding on probing than unaffected teeth. Furcation invasion was seen radiographically on 20% of the affected molars. Mobility was an uncommon finding. Only 1.7% of the teeth in this study demonstrated balancing interferences.

APPENDIX A  
Consent Form

## CONSENT FORM

1. I hereby volunteer to participate as a test subject in this experimental study. The purpose of this study is to determine how many people in the U.S. Air Force have juvenile periodontitis and rapidly progressing periodontitis (two progressive diseases causing bone loss around teeth which may lead to the loss of some teeth), and to describe what is found in the histories of patients with these diseases.

2. As a participant in this study, I will undergo routine diagnostic procedures, including x-rays, to diagnose periodontal (gum and bone around teeth) disease and I will have my blood studied. I will also be asked questions about my medical history and dental history as well as my family's medical and dental history.

3. I understand that, as a participant in this study, I will need to have a sample of my blood drawn (one time). The blood sample will involve the puncture of a vein in my arm with a needle and the withdrawal of approximately 15 cc's (1 tablespoon) of blood. It has been explained to me that the visit to have blood drawn will last approximately 30 minutes.

4. Risks: I understand that some discomfort can be expected during the diagnostic procedures. I also understand that I may have some tenderness or bruising at the place that blood is taken from my forearm.

5. I understand that I may benefit from participating in this study by receiving information regarding my dental health. If I choose not to participate in this study, I understand that I will continue to be managed and treated in accordance with standard medical and dental practice.

6. I understand that my entitlement to medical care and/or compensation in the event of injury is governed by federal laws and regulations, and if I desire further information I may contact \_\_\_\_\_.

7. Records of my participation in this study may only be disclosed in accordance with federal law, including the Federal Privacy Act, 5 USC 552a, and its implementing regulations.

8. The decision to participate in this program is completely voluntary on my part. No one has coerced or intimidated me

into participating in this program. I am participating because I want to. Dr. \_\_\_\_\_ has adequately answered any and all questions I have about this study, my participation, and the procedures involved. I understand that Dr. \_\_\_\_\_ will be available to answer any questions I have about procedures throughout this study. Should I choose to withdraw, my medical condition will continue to be treated in accordance with acceptable standards of medical treatment. I also understand that the investigator of this study may terminate my participation in this study at any time if he believes this to be in my best interest.

\*

\_\_\_\_\_  
(VOLUNTEER'S SIGNATURE AND SSAN) \_\_\_\_\_ (DATE)  
(\*If patient is a minor and in the opinion of the attending physician the minor can understand his/her participation in the study, the minor should sign this line.)

\_\_\_\_\_  
(VOLUNTEER'S ADDRESS)

\_\_\_\_\_  
(PARENT'S OR GUARDIAN'S SIGNATURE AND SSAN) \_\_\_\_\_ (DATE)

\_\_\_\_\_  
(ADVISING PHYSICIAN'S SIGNATURE AND SSAN) \_\_\_\_\_ (DATE)

\_\_\_\_\_  
(WITNESS) \_\_\_\_\_ (DATE)  
(Must witness all signatures above)

Privacy Act of 1974 applies. DD Form 2005 filed in Clinical/  
Medical Records.

Title: The Prevalence of Juvenile Periodontitis and Rapidly  
Progressing Periodontitis in a Young Military  
Population.

APPENDIX B  
Geographic Data

POPULATION FROM GEOGRAPHIC ENLISTMENT AREA 1  
 (ALABAMA, FLORIDA, GEORGIA, MISSISSIPPI, NORTH CAROLINA,  
 SOUTH CAROLINA AND TENNESSEE)  
 BY AGE, SEX AND RACE

		<u>AGE</u>	<u>17-21</u>	<u>%</u>	<u>22-27</u>	<u>%</u>	<u>TOTAL</u>	<u>%</u>
<u>SEX</u>	<u>RACE</u>							
	Caucasian		1361	(51.8)	344	(13.1)	1705	(64.9)
Male	Black		425	(16.2)	98	( 3.7)	523	(19.9)
	Other		18	( 0.7)	7	( 0.3)	25	( 1.0)
Total Male			1804	(68.6)	449	(17.1)	2253	(85.7)
	Caucasian		176	( 6.7)	76	( 2.9)	252	( 9.6)
Female	Black		86	( 3.3)	36	( 1.4)	122	( 4.6)
	Other		1	(0)	1	(0)	2	(0)
Total Female			263	(10.0)	113	( 4.3)	376	(14.3)
Total Caucasian			1537	(58.5)	420	(16.0)	1957	(74.4)
Total Black			511	(19.4)	134	( 5.1)	645	(24.5)
Total Other			19	( 0.7)	8	( 0.3)	27	( 1.0)
Total			2067	(78.6)	562	(21.4)	2629	(100)

Sample Size    n = 2629

SAMPLE FROM GEOGRAPHIC ENLISTMENT AREA 1  
 (ALABAMA, FLORIDA, GEORGIA, MISSISSIPPI, NORTH CAROLINA,  
 SOUTH CAROLINA AND TENNESSEE)  
 BY AGE, SEX, RACE AND PREVALENCE

		<u>AGE</u>	<u>17-21</u>	<u>PREVALENCE</u>	<u>22-27</u>	<u>PREVALENCE</u>	<u>TOTAL</u>	<u>PREVALENCE</u>
<u>SEX</u>	<u>RACE</u>							
	Caucasian		0	(0)	0	(0)	0	(0)
Male	Black		4	(.94)	1	(1.02)	5	(.96)
	Other		0	(0)	0	(0)	0	(0)
Total Male			4	(.22)	1	(.22)	5	(.22)
	Caucasian		1	(.57)	0	(0)	1	(.40)
Female	Black		0	(0)	1	(2.78)	1	(.82)
	Other		0	(0)	0	(0)	0	(0)
Total Female			1	(.38)	1	(.88)	2	(.53)
Total Caucasian			1	(.07)	0	(0)	1	(.05)
Total Black			4	(.78)	2	(1.49)	6	(.93)
Total Other			0	(0)	0	(0)	0	(0)
Total			5	(.24)	2	(.36)	7	(.27)

Sample Size    n = 7



POPULATION FROM GEOGRAPHIC ENLISTMENT AREA 2  
 (CONNECTICUT, WASHINGTON D.C., DELAWARE, KENTUCKY, MASSACHUSETTS,  
 MAINE, MARYLAND, NEW HAMPSHIRE, NEW JERSEY, NEW YORK, OHIO,  
 PENNSYLVANIA, RHODE ISLAND, VIRGINIA, VERMONT, WEST VIRGINIA)  
 BY AGE, SEX AND RACE

<u>SEX</u>	<u>AGE</u>	<u>17-21</u>	<u>%</u>	<u>22-27</u>	<u>%</u>	<u>TOTAL</u>	<u>%</u>
	<u>RACE</u>						
Male	Caucasian	3432	(59.8)	721	(12.4)	4153	(71.2)
	Black	576	( 9.9)	164	( 2.8)	740	(12.7)
	Other	63	( 1.1)	15	( 0.3)	78	( 1.3)
Total Male		4071	(69.8)	900	(15.4)	4971	(85.2)
Female	Caucasian	506	( 8.7)	142	( 2.4)	648	(11.1)
	Black	133	( 2.3)	65	( 1.1)	198	( 3.4)
	Other	14	( 0.2)	1	(0)	15	( 0.3)
Total Female		653	(11.2)	208	( 3.6)	861	(14.8)
Total Caucasian		3938	(67.5)	863	(14.8)	4801	(82.3)
Total Black		709	(12.2)	229	( 3.9)	938	(16.1)
Total Other		77	( 1.3)	16	( 0.3)	93	( 1.6)
Total		4724	(81.0)	1108	(19.0)	5832	(100)

Sample Size    n = 5832



SAMPLE FROM GEOGRAPHIC ENLISTMENT AREA 2  
 (CONNECTICUT, WASHINGTON D.C., DELAWARE, KENTUCKY, MASSACHUSETTS,  
 MAINE, MARYLAND, NEW HAMPSHIRE, NEW JERSEY, NEW YORK, OHIO,  
 PENNSYLVANIA, RHODE ISLAND, VIRGINIA, VERMONT, WEST VIRGINIA)  
 BY AGE, SEX, RACE AND PREVALENCE

<u>SEX</u>	<u>RACE</u>	<u>AGE</u>	<u>17-21</u>	<u>PREVALENCE</u>	<u>22-27</u>	<u>PREVALENCE</u>	<u>TOTAL</u>	<u>PREVALENCE</u>
Male	Caucasian		1	( .03)	2	( .28)	3	( .07)
	Black		4	( .69)	5	(3.05)	9	(1.22)
	Other		0	(0)	1	(6.67)	1	(1.28)
Total Male			5	( .12)	8	( .89)	13	( .26)
Female	Caucasian		2	( .40)	0	(0)	2	( .31)
	Black		2	(1.50)	2	(3.08)	4	(2.02)
	Other		0	(0)	0	(0)	0	(0)
Total Female			4	( .61)	2	( .96)	6	( .70)
Total Caucasian			3	( .08)	2	( .23)	5	( .10)
Total Black			6	( .85)	7	(3.06)	13	(1.39)
Total Other			0	(0)	1	(6.25)	1	(1.08)
Total			9	( .19)	10	( .90)	19	( .33)

Sample Size    n = 19

Includes 2 patients not clinically examined.  
 Panorex Only.

POPULATION FROM GEOGRAPHIC ENLISTMENT AREA 3  
 (IOWA, ILLINOIS, INDIANA, MICHIGAN, MINNESOTA, NORTH DAKOTA,  
 NEBRASKA, SOUTH DAKOTA AND WISCONSIN)  
 BY AGE, SEX AND RACE

<u>SEX</u>	<u>AGE</u>	<u>17-21</u>	<u>%</u>	<u>22-27</u>	<u>%</u>	<u>TOTAL</u>	<u>%</u>
	<u>RACE</u>						
Male	Caucasian	1790	(63.3)	429	(15.2)	2219	(78.4)
	Black	172	( 6.1)	46	( 1.6)	218	( 7.7)
	Other	29	( 1.0)	7	( 0.2)	36	( 1.3)
Total Male		1991	(70.4)	482	(17.0)	2473	(87.4)
Female	Caucasian	243	( 8.6)	76	( 2.7)	319	(11.3)
	Black	26	( 0.9)	8	( 0.3)	34	( 1.2)
	Other	2	( 0.1)	2	( 0.1)	4	( 0.1)
Total Female		271	( 9.6)	86	( 3.0)	357	(12.6)
Total Caucasian		2033	(71.8)	506	(17.9)	2538	(89.7)
Total Black		198	( 7.0)	54	( 1.9)	252	( 8.9)
Total Other		31	( 1.1)	9	( 0.3)	40	( 1.4)
Total		2262	(79.9)	569	(20.1)	2830	(100)

Sample Size    n = 2830

SAMPLE FROM GEOGRAPHIC ENLISTMENT AREA 3  
 (IOWA, ILLINOIS, INDIANA, MICHIGAN, MINNESOTA, NORTH DAKOTA,  
 NEBRASKA, SOUTH DAKOTA AND WISCONSIN)  
 BY AGE, SEX, RACE AND PREVALENCE

<u>SEX</u>	<u>AGE</u>	<u>17-21</u>	<u>PREVALENCE</u>	<u>22-27</u>	<u>PREVALENCE</u>	<u>TOTAL</u>	<u>PREVALENCE</u>
	<u>RACE</u>						
Male	Caucasian	0	(0)	0	(0)	0	(0)
	Black	3	(1.74)	3	(6.52)	6	(2.75)
	Other	0	(0)	0	(0)	0	(0)
Total Male		3	(.15)	3	(.62)	6	(.24)
Female	Caucasian	0	(0)	0	(0)	0	(0)
	Black	0	(0)	1	(12.5)	1	(2.94)
	Other	0	(0)	0	(0)	0	(0)
Total Female		0	(0)	1	(1.16)	1	(.28)
Total Caucasian		0	(0)	0	(0)	0	(0)
Total Black		3	(1.52)	4	(7.40)	7	(2.78)
Total Other		0	(0)	0	(0)	0	(0)
Total		3	(.13)	4	(.70)	7	(.25)

Sample Size    n = 7

Includes 2 patients not clinically examined.  
 Panorex Only.

POPULATION FROM GEOGRAPHIC ENLISTMENT AREA 4  
(IDAHO, MONTANA, OREGON, WASHINGTON AND WYOMING)  
BY AGE, SEX AND RACE

		<u>AGE</u>	<u>17-21</u>	<u>%</u>	<u>22-27</u>	<u>%</u>	<u>TOTAL</u>	<u>%</u>
<u>SEX</u>	<u>RACE</u>							
Male	Caucasian		498	(64.8)	109	(14.2)	607	(78.9)
	Black		7	( 0.9)	1	( 0.1)	8	( 1.0)
	Other		21	( 2.7)	6	( 0.8)	27	( 3.5)
Total Male			526	(68.4)	116	(15.1)	642	(83.5)
Female	Caucasian		97	(12.6)	26	( 3.4)	123	(16.0)
	Black		2	( 0.3)	1	( 0.1)	3	( 0.4)
	Other		1	( 0.1)	0	(0)	1	( 0.1)
Total Female			100	(13.0)	27	( 3.5)	127	(16.5)
Total Caucasian			595	(77.4)	135	(17.6)	730	(94.9)
Total Black			9	( 1.2)	2	( 0.3)	11	( 1.4)
Total Other			22	( 2.9)	6	( 0.8)	28	( 3.6)
Total			626	(81.4)	143	(18.6)	769	(100)

Sample Size    n = 769

SAMPLE FROM GEOGRAPHIC ENLISTMENT AREA 4  
 (IDAHO, MONTANA, OREGON, WASHINGTON AND WYOMING)  
 BY AGE, SEX, RACE AND PREVALENCE

	<u>AGE</u>	<u>17-21</u>	<u>PREVALENCE</u>	<u>22-27</u>	<u>PREVALENCE</u>	<u>TOTAL</u>	<u>PREVALENCE</u>
<u>SEX</u>	<u>RACE</u>						
	Caucasian	0	(0)	0	(0)	0	(0)
Male	Black	0	(0)	0	(0)	0	(0)
	Other	0	(0)	0	(0)	0	(0)
Total Male		0	(0)	0	(0)	0	(0)
	Caucasian	0	(0)	0	(0)	0	(0)
Female	Black	0	(0)	0	(0)	0	(0)
	Other	0	(0)	0	(0)	0	(0)
Total Female		0	(0)	0	(0)	0	(0)
Total Caucasian		0	(0)	0	(0)	0	(0)
Total Black		0	(0)	0	(0)	0	(0)
Total Other		0	(0)	0	(0)	0	(0)
Total		0	(0)	0	(0)	0	(0)

Sample Size    n = 0

POPULATION FROM GEOGRAPHIC ENLISTMENT AREA 5  
(ARIZONA, CALIFORNIA, COLORADO, NEW MEXICO, NEVADA AND UTAH)  
BY AGE, SEX AND RACE

		<u>AGE</u>	<u>17-21</u>	<u>%</u>	<u>22-27</u>	<u>%</u>	<u>TOTAL</u>	<u>%</u>
<u>SEX</u>	<u>RACE</u>							
Male	Caucasian		1130	(53.8)	240	(11.4)	1370	(65.2)
	Black		131	( 6.2)	38	( 1.8)	169	( 8.0)
	Other		185	( 8.8)	47	( 2.2)	232	(11.0)
Total Male			1446	(68.8)	325	(15.5)	1771	(84.3)
Female	Caucasian		187	( 8.9)	47	( 2.2)	234	(11.1)
	Black		42	( 2.0)	14	( 0.7)	56	( 2.7)
	Other		27	( 1.3)	13	( 0.6)	40	( 1.9)
Total Female			256	(12.2)	74	( 3.5)	330	(15.7)
Total Caucasian			1317	(62.7)	287	(13.7)	1605	(76.4)
Total Black			173	( 8.2)	52	( 2.5)	225	(10.7)
Total Other			212	(10.1)	60	( 2.9)	272	(12.9)
Total			1702	(81.0)	399	(19.0)	2101	(100)

Sample Size    n = 2101

SAMPLE FROM GEOGRAPHIC ENLISTMENT AREA 5  
(ARIZONA, CALIFORNIA, COLORADO, NEW MEXICO, NEVADA AND UTAH)  
BY AGE, SEX, RACE AND PREVALENCE

		<u>AGE</u>	<u>17-21</u>	<u>PREVALENCE</u>	<u>22-27</u>	<u>PREVALENCE</u>	<u>TOTAL</u>	<u>PREVALENCE</u>
<u>SEX</u>	<u>RACE</u>							
Male	Caucasian		0	(0)	2	(.83)	2	(.15)
	Black		0	(0)	0	(0)	0	(0)
	Other		0	(0)	0	(0)	0	(0)
Total Male			0	(0)	2	(.62)	2	(.11)
Female	Caucasian		0	(0)	0	(0)	0	(0)
	Black		0	(0)	0	(0)	0	(0)
	Other		0	(0)	0	(0)	0	(0)
Total Female			0	(0)	0	(0)	0	(0)
Total Caucasian			0	(0)	2	(.70)	2	(.12)
Total Black			0	(0)	0	(0)	0	(0)
Total Other			0	(0)	0	(0)	0	(0)
Total			0	(0)	2	(.50)	2	(.10)

Sample Size    n = 2

Includes 1 patient not clinically examined.  
Panorex Only.



POPULATION FROM GEOGRAPHIC ENLISTMENT AREA 6  
(ARKANSAS, KANSAS, LOUISIANA, MISSOURI, OKLAHOMA AND TEXAS)  
BY AGE, SEX AND RACE

<u>SEX</u>	<u>AGE</u>	<u>17-21</u>	<u>%</u>	<u>22-27</u>	<u>%</u>	<u>TOTAL</u>	<u>%</u>
	<u>RACE</u>						
Male	Caucasian	1150	(53.9)	317	(14.9)	1467	(68.8)
	Black	205	( 9.6)	56	( 2.6)	261	(12.2)
	Other	97	( 4.5)	30	( 1.4)	127	( 6.0)
Total Male		1452	(68.1)	403	(18.9)	1855	(87.0)
Female	Caucasian	153	( 7.2)	45	( 2.1)	198	( 9.3)
	Black	46	( 2.2)	13	( 0.6)	59	( 2.8)
	Other	19	( 0.9)	2	( 0.1)	21	( 1.0)
Total Female		218	(10.2)	60	( 2.8)	278	(13.0)
Total Caucasian		1303	(61.1)	362	(17.0)	1665	(78.1)
Total Black		251	(11.8)	69	( 3.2)	320	(15.0)
Total Other		116	( 5.4)	32	( 1.5)	148	( 6.9)
Total		1670	(78.3)	463	(21.7)	2133	(100)

Sample Size    n = 2133



SAMPLE FROM GEOGRAPHIC ENLISTMENT AREA 6  
 (ARKANSAS, KANSAS, LOUISIANA, MISSOURI, OKLAHOMA AND TEXAS)  
 BY AGE, SEX, RACE AND PREVALENCE

		<u>AGE</u>	<u>17-21</u>	<u>PREVALENCE</u>	<u>22-27</u>	<u>PREVALENCE</u>	<u>TOTAL</u>	<u>PREVALENCE</u>
<u>SEX</u>	<u>RACE</u>							
Male	Caucasian		1	( .09)	1	( .32)	2	( .14)
	Black		2	( .98)	2	(3.57)	4	(1.53)
	Other		0	(0)	0	(0)	0	(0)
Total Male			3	( .21)	3	( .74)	6	( .32)
Female	Caucasian		1	( .65)	0	(0)	1	( .50)
	Black		1	(2.17)	0	(0)	1	(1.69)
	Other		0	(0)	0	(0)	0	(0)
Total Female			2	( .92)	0	(0)	2	( .72)
Total Caucasian			2	( .15)	1	( .28)	3	( .18)
Total Black			3	(1.20)	2	(2.90)	5	(1.56)
Total Other			0	(0)	0	(0)	0	(0)
Total			5	( .30)	3	( .65)	8	( .38)

Sample Size    n = 8

Includes 2 patients not clinically examined.  
 Panorex Only.

POPULATION FROM GEOGRAPHIC ENLISTMENT AREA 7  
(ALASKA, HAWAII AND OTHER)  
BY AGE, SEX AND RACE

<u>SEX</u>	<u>AGE</u>	<u>17-21</u>	<u>%</u>	<u>22-27</u>	<u>%</u>	<u>TOTAL</u>	<u>%</u>
	<u>RACE</u>						
Male	Caucasian	147	(40.4)	42	(11.5)	189	(51.9)
	Black	16	( 4.4)	1	( 0.3)	17	( 4.7)
	Other	72	(19.8)	41	(11.3)	113	(31.0)
Total Male		235	(64.0)	84	(23.1)	319	(87.6)
Female	Caucasian	21	( 5.8)	4	( 1.1)	25	( 6.9)
	Black	3	( 0.8)	1	( 0.3)	4	( 1.1)
	Other	9	( 2.5)	7	( 1.9)	16	( 4.4)
Total Female		33	( 9.1)	12	( 3.3)	45	(12.4)
Total Caucasian		168	(46.2)	46	(12.6)	214	(58.8)
Total Black		19	( 5.2)	2	( 0.5)	21	( 5.8)
Total Other		81	(22.3)	48	(13.2)	129	(35.4)
Total		268	(73.6)	96	(26.4)	364	(100)

Sample Size    n = 364

SAMPLE FROM GEOGRAPHIC ENLISTMENT AREA 7  
(ALASKA, HAWAII AND OTHER)  
BY AGE, SEX, RACE AND PREVALENCE

	<u>AGE</u>	<u>17-21</u>	<u>PREVALENCE</u>	<u>22-27</u>	<u>PREVALENCE</u>	<u>TOTAL</u>	<u>PREVALENCE</u>
<u>SEX</u>	<u>RACE</u>						
	Caucasian	0	(0)	0	(0)	0	(0)
Male	Black	0	(0)	0	(0)	0	(0)
	Other	0	(0)	0	(0)	0	(0)
Total Male		0	(0)	0	(0)	0	(0)
	Caucasian	0	(0)	0	(0)	0	(0)
Female	Black	0	(0)	0	(0)	0	(0)
	Other	1	(11.1)	0	(0)	1	(6.25)
Total Female		1	(3.03)	0	(0)	1	(2.22)
Total Caucasian		0	(0)	0	(0)	0	(0)
Total Black		0	(0)	0	(0)	0	(0)
Total Other		1	(1.23)	0	(0)	1	(.75)
Total		1	(.37)	0	(0)	1	(.27)

Sample Size    n = 1

APPENDIX C

Patient Documentation Forms

GI:.79 PLI:.85 CALCULUS INDEX:.17  
H=Horizontal A=Angular +=yes -=no

**AGE: 19**

GI:1.04 PLI:1.35 CALCULUS INDEX:.17  
H=Horizontal A=Angular +=yes -=no

H=Horizontal A=Angular +=yes -=no







NAME: Carter, Michael  
 RACE: Black SEX: Male

SSN: 460-35-6441  
 PLACE OF ENLISTMENT: Texas

AGE: 18

TOOTH	PERCENT	BLISS	TBL YOD PNS EES	FURCA TION	CARRIES	CALCULUS	6	PLI	CALCULUS	INDEX	MOBILITY	PRETHAL	DEPT H	PROB TH	LYNGUAL	BLEEDING	LYNGUAL	BLEEDING	DI CLEUR SF AE LR
	M/D	M/D																	
1	IM	PA	C	T	E	D													
2	40	-	H	-	-	-	1 0 1 1	.75	1 1 1 1	1.00	-	-	3 2 3	4 3 3	-	-	-	-	-
3	30	40	H	H	-	+	2 0 0 2	1.00	1 1 1 1	1.00	-	-	7 2 3	5 2 5	+	-	-	-	+
4	0	10	-	H	-	-	1 0 0 2	.75	1 0 1 2	1.00	-	-	3 2 5	4 2 5	-	+	-	-	+
5	-	0	-	-	-	-	1 0 0 1	.50	1 0 1 1	.75	-	-	3 2 3	2 2 3	-	-	-	-	-
6	0	-	-	-	-	-	1 0 0 1	.50	1 0 0 1	.50	-	-	4 4 3	2 2 2	-	-	-	-	-
7	10	10	H	H	-	-	2 1 0 1	1.00	2 1 0 1	1.00	-	-	1 3 2	3 3 2	2	-	-	-	-
8	0	40	-	A	-	-	1 0 0 1	.50	1 2 1 2	1.50	-	-	1 3 5	7 3 1	8	-	-	-	-
9	0	40	-	A	-	-	1 0 0 1	.50	1 0 0 1	.50	-	-	3 6 9	3 3 7	-	-	-	-	-
10	10	0	H	-	-	-	2 0 0 1	.75	2 1 0 1	1.00	-	-	3 2 3	3 2 3	+	-	-	-	-
11	0	0	-	-	-	-	1 0 0 1	.50	1 1 0 1	.75	-	-	3 2 3	3 1 3	-	-	-	-	-
12	0	20	-	H	-	-	1 0 0 1	.50	1 0 1 1	.75	-	-	3 2 5	4 1 3	-	-	-	-	-
13	20	20	H	H	-	-	1 0 1 2	1.00	1 1 0 1	.75	-	-	9 3 5	3 2 3	-	-	-	-	+
14	30	40	A	H	-	+	2 0 0 2	1.00	2 2 1 2	1.75	-	-	5 3 3	5 2 4	-	+	-	-	-
15	50	-	H	-	-	+	2 0 1 2	1.25	2 2 1 2	1.75	-	-	3 3 3	3 3 3	-	-	+	-	+
16	IM	PA	C	T	E	D													
17	IM	PA	C	T	E	D													
18	20	-	H	-	+	-	2 1 1 2	1.50	2 1 2 1	1.50	-	-	5 3 3	6 2 3	-	+	+	-	-
19	60	40	A	H	-	+	2 1 0 2	1.25	1 1 1 2	1.25	-	-	10 2 7	10 2 7	-	-	-	-	+
20	20	10	H	H	-	-	2 1 0 2	1.25	1 0 1 1	.75	-	-	5 2 6	5 2 3	-	-	+	-	-
21	0	20	-	A	-	-	2 1 0 2	1.25	1 0 1 1	.75	-	-	2 1 3	2 1 2	-	+	-	-	-
22	0	0	-	-	-	-	1 1 1 2	1.25	1 0 1 1	.75	-	-	3 2 2	3 1 3	-	-	-	-	-
23	10	0	H	-	-	-	2 0 0 1	.75	1 0 1 1	.75	-	-	3 3 3	2 1 2	-	-	+	-	-
24	0	50	-	A	-	-	1 0 0 1	.50	1 0 1 1	.75	-	-	1 2 2	7 3 1	5	-	-	-	-
25	0	0	-	-	-	-	1 0 0 1	.50	1 0 1 1	.75	-	-	1 2 2	3 2 1	2	-	-	-	-
26	0	0	-	-	-	+	1 0 0 2	.75	1 1 1 1	1.00	-	-	3 2 3	2 1 2	-	+	-	-	-
27	0	-	-	-	-	-	1 0 1 1	.75	1 1 1 1	1.00	-	-	3 2 3	2 2 2	-	-	-	-	-
28	-	0	-	-	-	-	1 0 0 1	.50	1 1 0 1	.75	-	-	3 1 3	3 1 2	-	-	-	-	-
29	0	30	-	H	-	-	1 0 0 2	.75	1 1 1 1	1.00	-	-	3 2 5	3 2 4	-	+	-	-	+
30	20	0	H	-	+	-	2 0 0 1	.75	2 1 1 1	1.25	-	-	4 2 3	4 2 3	-	-	+	-	-
31	0	-	-	-	-	+	1 0 1 1	.75	2 1 2 1	1.50	-	-	3 3 4	3 2 2	-	-	-	-	-
32																			

GI: .82 PLI: .99 CALCULUS INDEX: 0  
 H=Horizontal A=Angular +=yes -=no

NAME: Chadwick, Mitchell T.  
 RACE: Caucasian SEX: Male

SSN: 415-02-4602  
 PLACE OF ENLISTMENT: California

AGE: 25

TOOTH PERCENT	BONES		TBL YOODNS EES	FURCA TION	XRAY	CALCULUS	G				P				CALCULUS	INDEX	MOBILITY	PROPTH	FACIAL	PROPTH	LINGUAL	BLEEDING	FACIAL	BLEEDING	LINGUAL	ONCE LURE SF AL							
	MID	MID					MID	MID	FIL	D	T	MID	MID	FIL													D	T					
1	MI	SS	I	N	G																												
2	30	20	H	H	-	-	+	-	2	1	1	1	1.25	2	2	1	2	1.75	1	-	-	5	3	3	3	2	3	+	-	-	-	-	-
3	20	30	H	H	+	+	+	+	2	0	1	1	1.00	2	1	1	2	1.50	-	1	-	5	3	5	5	3	5	+	-	-	-	-	-
4	0	30	-	H	-	-	-	+	2	0	0	1	.75	1	1	1	1	1.00	-	-	-	4	2	5	3	2	4	-	-	-	+	-	-
5	20	20	H	H	-	-	-	-	1	0	0	1	.50	1	0	1	1	.75	-	-	-	3	2	5	3	2	3	-	-	-	-	-	-
6	0	20	-	H	-	-	-	-	2	0	0	1	.75	1	1	0	1	.75	-	-	-	3	2	4	4	3	3	+	-	-	-	-	-
7	20	30	H	H	-	-	-	-	2	0	0	1	.75	1	0	0	1	.50	-	-	-	3	2	2	3	3	4	-	-	-	+	-	-
8	40	40	H	H	-	-	-	-	2	0	0	0	.50	1	0	1	1	.75	-	-	-	5	3	2	5	3	3	+	-	-	+	-	-
9	40	30	H	H	-	-	-	-	1	0	1	1	.75	1	0	1	1	.75	-	-	-	5	2	3	5	2	3	-	-	-	-	-	-
10	30	40	H	H	-	-	-	-	1	0	0	1	.50	1	0	1	1	.75	-	-	-	5	2	4	3	2	3	-	-	-	-	-	-
11	10	10	H	H	-	-	-	-	2	0	0	1	.75	1	0	0	1	.50	-	-	-	4	2	3	3	2	3	+	-	-	-	-	-
12	0	10	-	H	-	-	-	-	2	0	0	2	1.00	1	1	1	1	1.00	-	-	-	3	2	5	3	3	5	-	-	-	+	-	-
13	10	30	H	H	-	+	-	-	1	0	0	1	.50	1	1	1	1	1.00	-	-	-	5	2	5	4	2	4	-	-	-	-	-	-
14	20	30	A	H	+	+	+	+	2	0	0	1	.75	1	1	1	1	1.00	-	1	-	5	2	6	4	2	5	-	-	-	+	-	-
15	20	30	H	H	-	-	+	-	2	1	1	2	1.50	2	2	1	2	1.75	1	-	-	6	4	5	5	3	5	-	-	+	+	-	+
16	30	40	H	H	-	-	-	-	2	1	1	2	1.50	2	2	1	2	1.75	1	1	-	5	3	3	5	3	4	-	-	-	-	-	-
17	30	-	H	-	-	-	-	-	2	1	1	1	1.25	2	2	2	2	2.00	-	1	-	4	3	3	5	3	3	-	-	-	+	-	-
18	10	30	H	H	-	+	+	+	2	0	1	2	1.25	2	1	2	2	1.75	-	1	-	5	3	5	4	3	5	+	-	+	-	-	-
19	10	20	H	H	-	+	+	-	2	0	2	2	1.50	1	1	1	1	1.00	-	-	-	4	2	5	4	2	5	-	-	+	+	+	+
20	10	10	H	H	-	+	+	+	2	0	2	2	1.50	1	0	1	1	.75	-	1	-	3	2	4	3	3	4	-	-	-	+	+	+
21	10	10	H	H	-	-	-	-	2	0	1	1	1.00	1	0	1	1	.75	-	1	-	4	2	3	3	3	3	-	-	-	-	-	-
22	0	0	-	-	-	-	-	-	2	0	2	2	1.50	2	0	2	2	1.50	-	1	-	4	2	4	3	2	3	-	-	-	+	-	-
23	50	10	H	H	-	-	-	-	2	0	2	2	1.50	2	2	2	2	2.00	1	2	1	5	3	4	2	2	3	-	-	-	-	-	-
24	80	70	H	H	-	-	+	-	3	3	2	3	2.75	3	3	3	3	3.00	3	3	1	1	5	5	5	2	3	+	-	+	+	-	-
25	MI	SS	I	N	G																												
26	50	40	H	H	-	-	-	+	3	2	1	2	2.00	3	3	2	2	2.50	3	1	1	4	4	5	4	2	2	-	-	+	+	-	-
27	10	10	H	H	-	-	-	+	3	2	1	2	2.00	3	3	2	2	2.50	3	1	1	4	4	5	4	2	2	-	-	+	+	-	-
28	10	20	H	H	-	-	+	-	2	0	1	1	1.00	2	0	2	2	1.50	-	-	-	3	2	3	3	3	3	-	-	-	+	-	-
29	10	20	H	H	-	-	+	+	2	0	2	2	1.50	2	0	2	2	1.50	-	-	-	3	2	4	4	3	5	+	-	-	+	+	+
30	20	10	H	H	-	+	+	+	2	0	1	2	1.25	2	2	2	2	2.00	-	1	-	5	3	5	5	3	5	+	-	-	+	-	+
31	20	20	H	H	-	-	+	+	2	1	1	1	1.25	2	2	2	2	2.00	1	1	-	5	4	6	4	3	5	-	-	-	+	-	-
32	30	0	H	-	-	-	-	-	1	1	1	1	1.00	2	2	2	2	2.00	1	1	-	5	5	5	5	4	4	-	-	-	-	-	-

GI:1.14 PLI:1.38 CALCULUS INDEX:2.17  
 H=Horizontal A=Angular +=yes -=no

NAME: Clark, Cheryl  
RACE: Caucasian

SEX: Female

SSN: 444-48-5003

PLACE OF ENLISTMENT: Oklahoma

AGE: 21

TOOTH PERCENT	LOSS		TBL YOUNG PNS ES		FUR CATION		XRAY CALCULUS		G		P L		INDEX CALCULUS		MOBILITY		DEPTH FACIAL		DEPTH LINGUAL		B L E E D I N G		B L E E D I N G		O C C L U S I O N									
	MID	MID			MID	FIL	D	T	MIF	D	T	FIL	MIF	D	MIL	D	MIF	D	MIL	D														
1	IMPACTED																																	
2	30	0	H	-	-	+	-	1	2	2	2	1.75	1	1	1	2	1.25	-	-	5	3	3	4	2	3	-	+	+	-	-				
3	30	40	H	H	+	+	+	2	0	2	1	1.25	1	1	0	2	1.00	-	-	1	5	2	7	7	2	4	+	-	-	+	-			
4	0	0	-	-	-	-	-	+	2	1	0	2	1.25	1	0	0	1	.50	-	-	-	4	2	4	3	2	4	+	-	-	-	+	-	
5	MISSING																																	
6	10	10	H	H	-	-	-	2	0	0	1	.75	2	0	0	1	.75	-	-	-	5	2	4	5	2	3	+	-	-	-	-	-	-	
7	80	30	H	H	-	-	-	2	0	2	2	1.50	1	1	1	2	1.25	-	-	1	7	2	4	6	4	3	+	-	+	+	-	+	-	
8	70	30	H	H	-	-	-	2	2	2	2	2.00	2	1	1	1	1.25	-	-	11	5	4	5	10	4	5	-	+	+	-	+	-	-	
9	70	60	H	H	-	-	-	2	0	2	2	1.50	1	1	1	1	1.00	-	-	11	4	3	8	5	3	5	-	-	+	+	-	+	-	
10	40	40	H	H	-	-	-	2	0	1	2	1.25	1	1	0	1	.75	-	-	11	8	3	2	6	3	3	+	-	-	+	-	-	-	
11	0	10	-	H	-	-	-	2	0	1	2	1.25	1	1	0	1	.75	-	-	11	3	2	3	4	3	3	+	-	-	-	-	-	-	
12	MISSING																																	
13	0	10	-	H	-	-	-	+	2	0	0	2	1.00	1	1	1	2	1.25	-	-	1	5	3	5	3	3	5	-	-	+	-	-	-	-
14	MISSING																																	
15	20	0	H	-	-	-	+	-	2	0	0	2	1.00	2	2	1	2	1.75	1	-	-	6	4	3	5	3	3	+	-	-	-	-	-	-
16	IMPACTED																																	
17	IMPACTED																																	
18	0	-	-	-	-	-	+	-	2	0	1	1	1.00	1	1	2	1	1.25	-	-	-	4	5	3	5	2	3	-	-	-	+	-	-	-
19	MISSING																																	
20	0	0	-	-	-	-	-	2	0	1	2	1.25	1	0	1	1	.75	-	-	1	4	2	3	4	3	4	-	-	+	+	-	-	-	-
21	0	0	-	-	-	-	-	2	0	1	2	1.25	1	0	0	1	.50	-	-	1	3	1	4	3	2	3	-	-	-	+	-	-	-	-
22	0	0	-	-	-	-	-	1	0	2	2	1.25	1	0	0	1	.50	-	-	1	3	2	3	3	2	3	-	-	-	-	+	-	-	-
23	0	0	-	-	-	-	-	2	0	1	2	1.25	1	1	1	1	1.00	-	-	1	3	2	3	3	2	3	+	-	-	+	-	-	-	-
24	60	0	H	-	-	-	-	1	0	0	2	.75	1	1	1	1	1.00	-	1	1	10	2	4	10	4	3	-	-	+	-	-	+	-	-
25	40	30	H	H	-	-	-	2	0	0	2	1.00	1	0	1	1	.75	-	1	1	7	3	2	7	4	7	+	-	-	-	+	-	-	-
26	30	10	H	H	-	-	-	2	0	2	2	1.50	1	1	1	1	1.00	-	-	1	7	2	5	8	6	3	-	-	-	+	+	+	-	-
27	10	10	H	H	-	-	-	2	0	1	2	1.25	1	0	1	1	.75	-	-	1	5	2	4	3	2	3	+	-	+	+	-	-	-	-
28	0	0	-	-	-	-	-	2	0	0	2	1.00	1	0	0	1	.50	-	-	-	4	2	3	4	2	4	+	-	-	-	+	-	-	-
29	0	10	-	H	-	-	+	-	2	0	0	1	.75	1	0	0	1	.50	-	-	1	4	2	3	4	3	3	-	-	-	+	-	-	-
30	MISSING																																	
31	0	-	-	-	-	-	-	2	1	0	1	1.00	1	1	0	1	.75	-	-	-	5	2	2	5	3	3	+	-	-	+	-	-	-	-
32	IMPACTED																																	

G1:1.20 PLI:.90 CALCULUS INDEX:.33  
H=Horizontal A=Angular +=yes -=no





NAME: Ford, Theresa SSN: 163-48-5078  
RACE: Black SEX: Female PLACE OF ENLISTMENT: S. Dakota AGE: 27

[illegible]

GI:1.41 PLI:.80 CALCULUS INDEX: 0  
H=Horizontal A=Angular +=yes -=no

NAME: Gaskins, Arnell, Jr.  
 RACE: Black

SEX: Male

SSN: 103-48-1037  
 PLACE OF ENLISTMENT: New York

AGE: 26

T D O T H E N T	B L O O D S	T B L Y O D P N S E S	F U R C A T I O N	C A R R I E S	C A L C U L U S	G I	P L I	C A L C U L U S	M O B I L I T Y	P R O B I N G	F A C I A L	P R O B I N G	L I N G U A L	B L E E D I N G	F A C I A L	L I N G U A L	O I C N C T U R S F A E L R
MID	MID																
1	IM	PA	C	T	E	D											
2	40	-	H	-	-	-	+	-	2	0	0	2	1.00	1	0	0	1
3	30	40	H	H	-	-	+	+	2	1	1	2	1.50	1	1	0	1
4	10	30	H	H	-	-	+	+	2	1	0	2	1.25	1	1	0	1
5	40	30	H	H	-	-	+	+	2	0	1	2	1.25	2	0	0	1
6	10	20	H	H	-	-	+	+	2	0	1	2	1.25	1	1	0	1
7	20	20	H	H	-	-	+	+	2	0	1	2	1.25	1	0	0	1
8	30	20	H	H	-	-	+	+	1	0	2	2	1.25	1	0	0	1
9	20	20	H	H	-	-	+	-	2	0	2	2	1.50	1	0	1	1
10	20	20	H	H	-	-	+	+	2	1	1	2	1.50	1	0	1	1
11	10	20	H	H	-	-	+	+	2	1	1	2	1.50	1	1	1	1
12	20	10	H	H	-	-	+	+	2	0	0	2	1.00	1	0	0	1
13	20	30	H	H	-	-	+	+	2	1	1	2	1.50	1	1	0	1
14	40	50	H	H	-	-	+	+	2	0	1	2	1.25	1	1	0	1
15	30	-	H	-	-	+	+	-	2	0	1	2	1.25	1	1	0	1
16	IM	PA	C	T	E	D											
17	10	10	H	H	-	-	+	-	2	0	1	2	1.25	1	1	1	1
18	10	30	H	A	-	-	+	+	1	0	1	1	.75	1	1	1	1
19	MI	SS	I	N	G												
20	20	10	H	H	-	-	-	-	2	0	2	2	1.50	1	0	0	1
21	10	10	H	H	-	-	+	+	2	1	1	2	1.50	1	0	1	1
22	30	10	H	H	-	-	+	+	2	0	1	2	1.25	1	0	1	1
23	30	30	H	H	-	-	+	+	2	1	1	2	1.50	1	0	1	1
24	30	30	H	H	-	-	+	+	1	1	1	2	1.25	1	0	1	1
25	30	30	H	H	-	-	+	+	1	0	1	1	.75	1	0	1	1
26	20	20	H	H	-	-	+	+	2	1	1	1	1.25	1	0	1	1
27	10	20	H	H	-	-	+	+	1	0	1	2	1.00	1	0	1	1
28	20	20	H	H	-	-	+	+	2	1	1	2	1.50	1	0	1	1
29	30	20	A	H	-	-	+	+	2	1	1	1	1.25	1	0	1	1
30	30	80	H	A	-	-	+	+	2	0	1	2	1.25	1	0	1	1
31	40	30	H	H	-	-	+	+	2	0	1	2	1.25	1	0	1	1
32	20	10	H	H	-	-	-	-	2	2	1	2	1.75	2	2	1	2

G1:1.28 PLI: .77 CALCULUS INDEX:2.33  
 H=Horizontal A=Angular +=yes -=no

GI:1.19 PLI:1.35 CALCULUS INDEX:1.33  
H=Horizontal A=Angular +=yes -=no



NAME: Horton, Phyllis  
 RACE: Caucasian

SEX: Male

SSN: 440-72-5260

PLACE OF ENLISTMENT: Oklahoma

AGE: 24

TOOTH	PERCENT		BLOODS	TBL YOUNG	FURCATION	CARRIES	CALCULUS	GI				PLI				CALCULUS	INDEX	MOBILITY	PROBING	FACIAL	PROBING	LINGUAL	BLEEDING	FACIAL	BLEEDING	LINGUAL	OICTEURSFALR					
	MID	MID						MID	MID	FIL	ID	T	MID	FIL	ID													T	FIL	MID	D	MID
1	MI	SS	I	N	G																											
2	10	0	H	-	-	+	-	2	2	0	2	1.50	2	1	1	2	1.50	-	-	6	5	4	3	2	2	+	-	-	-	+	-	
3	30	30	H	H	+	+	-	2	0	2	2	1.50	1	1	1	1	1.00	-	-	7	2	6	6	2	4	+	-	+	-	-	-	
4	30	10	H	H	-	+	-	2	1	1	2	1.50	2	0	1	1	1.00	-	-	9	2	5	8	2	4	+	-	-	+	-	-	
5	10	40	H	H	-	+	-	2	2	2	2	2.00	2	0	0	1	.75	-	-	8	5	9	7	3	8	-	+	+	+	+	-	
6	20	20	H	H	-	-	-	2	0	2	2	1.50	1	1	1	1	1.00	-	-	10	2	7	7	5	7	+	-	-	+	+	-	
7	30	30	H	H	-	-	-	2	1	1	2	1.50	1	0	0	1	.50	-	-	7	2	7	5	2	5	-	-	+	-	-	-	
8	40	20	H	H	-	-	-	2	0	1	2	1.25	1	0	0	1	.50	-	-	7	2	6	7	3	5	-	-	-	-	+	-	
9	30	20	H	H	-	-	-	2	0	1	2	1.25	1	0	0	1	.50	-	-	5	2	3	7	2	3	-	-	-	+	-	-	
10	20	10	A	H	-	-	-	2	0	1	2	1.25	1	0	0	1	.50	-	-	7	2	4	7	3	4	-	-	-	-	+	-	
11	0	20	-	H	-	-	-	2	0	0	2	1.00	1	0	0	1	.50	-	-	5	2	6	5	2	6	+	-	-	+	+	-	
12	10	50	H	A	-	+	-	2	1	0	2	1.25	1	0	0	1	.50	-	-	5	3	8	5	2	7	-	-	+	+	-	-	
13	40	20	H	H	-	+	-	2	1	1	2	1.50	1	0	0	1	.50	-	-	9	2	7	7	2	7	+	-	+	+	-	-	
14	40	40	A	A	-	+	-	2	2	1	2	1.75	1	2	1	2	1.50	-	-	9	4	7	7	2	5	+	+	+	+	-	-	
15	30	40	H	H	-	+	-	2	2	1	2	1.75	2	1	1	2	1.50	-	-	7	3	7	5	3	5	+	+	+	+	-	-	
16	MI	SS	I	N	G																											
17	MI	SS	I	N	G																											
18	30	0	H	-	-	+	-	2	0	2	2	1.50	2	1	2	2	1.75	-	-	6	2	3	8	3	3	+	-	+	+	+	-	-
19	30	20	A	H	-	+	-	2	1	1	2	1.50	2	1	2	2	1.75	-	-	8	2	5	5	2	5	+	-	+	-	-	+	-
20	30	30	H	H	-	+	-	2	0	1	2	1.25	1	0	1	1	.75	-	-	7	2	7	7	5	8	+	-	+	-	-	+	-
21	30	20	H	H	-	-	-	2	0	1	2	1.25	1	0	0	1	.50	-	-	3	2	7	4	5	5	-	-	-	-	+	-	-
22	10	10	H	A	-	-	-	2	0	2	2	1.50	1	0	0	1	.50	-	-	3	2	7	3	4	5	-	-	-	-	+	-	-
23	10	10	H	H	-	-	-	2	1	2	2	1.75	1	0	0	1	.50	-	-	5	2	5	4	2	5	-	-	+	-	-	-	-
24	10	20	H	H	-	-	-	2	0	1	2	1.25	1	0	1	1	.75	-	1	5	2	4	3	2	3	-	-	-	-	-	-	-
25	10	10	H	H	-	-	-	2	0	1	2	1.25	1	0	0	1	.50	-	1	3	2	3	3	2	3	-	-	-	-	-	-	-
26	10	10	H	H	-	-	-	2	1	1	2	1.50	1	0	0	1	.50	-	-	4	2	3	4	2	3	-	-	-	-	-	-	-
27	0	10	-	H	-	-	-	1	2	1	2	1.50	1	0	0	1	.50	-	-	3	4	6	3	2	3	-	+	+	-	-	-	-
28	10	30	H	H	-	-	-	2	1	1	2	1.50	1	0	1	1	.75	-	-	6	2	7	6	7	7	-	-	-	-	-	+	-
29	30	40	H	A	-	+	-	2	2	2	2	2.00	1	0	1	2	1.00	-	-	7	6	8	7	7	7	-	+	-	+	+	+	-
30	30	30	H	H	-	+	-	2	1	1	2	1.50	1	1	1	1	1.00	-	-	7	3	6	7	3	5	-	-	+	+	-	+	-
31	20	20	H	H	-	+	-	2	2	1	2	1.75	2	2	2	2	2.00	-	-	7	5	5	7	4	4	+	+	-	+	-	+	-
32	MI	SS	I	N	G																											

GI: 1.44 PLI: .86 CALCULUS INDEX: .16

H=Horizontal A=Angular +=yes -=no

NAME: Johnson, William I. SSN: 220-64-7227 AGE: 25  
 RACE: Black SEX: Male PLACE OF ENLISTMENT: Maryland

TOOTH	PALLIUM	BOOTS	LINGS	TBL YOUNG	FUNCTION	CARRY	CALCULUS	G				P				CALCULUS	INDEX	MOBILITY	PROBING	FACIAL	PROBING	LINGUAL	FACIAL	BLEEDING	LINGUAL	OIN CYL UR SF AL									
								MID	MID	F	I	L	D	T	MID												MID	F	I	L	D	T			
1	30	20	H	A	-	-	+	2	1	1	2	2.50	3	3	1	3	2.50	1	1	-	6	5	4	5	3	3	+	-	-	-	+	-			
2	0	20	-	H	+	+	+	2	1	1	2	2.50	1	1	1	2	1.25	1	1	-	5	3	5	4	3	5	-	-	-	+	-	-			
3	10	10	H	H	-	+	+	-	2	1	1	2	2.50	1	1	0	1	.75	1	1	-	6	3	5	5	3	4	+	-	-	+	-	-		
4	10	10	H	H	-	+	+	-	2	0	1	2	1.25	1	1	0	1	.75	-	1	-	5	2	5	6	4	5	+	-	-	-	+	-		
5	30	20	H	H	-	-	+	2	0	1	1	1.0	1	1	0	1	.75	-	1	-	5	2	5	5	4	5	+	-	-	-	-	-	-		
6	20	20	H	H	-	-	+	2	0	2	1	1.25	0	1	1	1	.75	-	1	-	6	2	6	5	4	6	-	-	-	+	+	-	-		
7	30	40	H	H	-	-	+	2	2	1	2	1.75	1	1	1	1	1.00	1	1	-	5	3	5	4	3	4	+	-	-	+	-	+	-		
8	40	30	H	H	-	-	+	2	0	1	2	1.25	1	0	1	1	.75	-	1	1	6	2	5	5	3	5	+	-	-	+	-	+	-		
9	30	30	H	H	-	-	+	2	0	1	2	1.25	1	0	1	1	.75	1	1	1	6	2	7	5	3	4	-	-	-	+	-	+	-		
10	40	40	H	H	-	-	+	-	2	0	1	2	1.25	1	0	1	1	.75	1	1	-	6	3	4	5	3	5	-	-	-	+	-	+	-	
11	20	20	H	H	-	-	+	-	2	0	1	2	1.25	1	0	1	1	.75	-	1	-	5	3	6	6	4	4	+	-	-	+	-	+	-	
12	10	20	H	H	-	-	+	2	0	1	2	1.25	1	0	1	1	.75	1	1	-	5	2	3	5	4	5	+	-	-	+	-	+	-		
13	0	10	-	H	-	-	+	2	1	1	2	1.50	1	0	1	1	.75	1	1	-	3	3	3	5	4	4	+	-	-	+	-	+	-		
14	MI	SS	I	N	G																														
15	20	0	H	-	-	-	+	-	2	1	1	2	1.50	1	0	1	1	.75	1	1	-	4	4	5	4	3	4	-	-	-	+	-	+	-	
16	MI	SS	I	N	G																														
17	SE	VE	RE			+																													
18	10	20	H	A	-	+	+	2	2	2	2	2.00	2	0	2	2	1.50	1	1	-	4	5	5	4	3	3	+	+	-	+	+	+	-	-	
19	20	10	H	H	-	+	+	2	0	1	2	1.25	1	0	1	1	.75	-	1	-	5	2	5	4	3	4	-	-	-	+	-	+	-	-	
20	10	10	H	H	-	-	+	1	1	1	1	1.00	1	0	1	1	.75	-	1	-	4	2	5	5	4	5	-	-	-	-	-	-	-	-	
21	10	20	H	H	-	-	+	2	1	1	2	1.50	1	0	1	1	.75	-	1	-	4	2	4	4	3	5	-	-	-	+	-	+	-	-	
22	30	30	H	H	-	-	+	-	2	1	2	2	1.75	2	0	2	2	1.50	-	2	-	4	2	3	2	2	3	+	-	-	+	+	+	-	-
23	40	40	H	H	-	-	+	2	2	2	2	2.00	2	1	2	2	1.75	1	3	-	2	2	5	3	2	2	+	+	+	+	+	+	-	-	
24	40	50	H	H	-	-	+	2	2	2	2	2.00	2	2	2	2	2.00	2	3	1	4	2	2	3	3	3	+	-	+	+	+	+	-	-	
25	30	40	H	H	-	-	+	2	2	2	2	2.00	2	2	2	2	2.00	2	3	1	3	2	3	3	3	2	-	-	-	+	+	+	-	-	
26	30	30	H	H	-	-	+	2	2	2	2	2.00	2	1	2	2	1.75	2	3	1	2	2	2	3	2	2	-	-	-	+	+	+	-	-	
27	20	20	H	H	-	-	+	-	2	2	2	2	2.00	2	0	2	2	1.50	2	3	-	2	2	3	2	3	3	-	-	+	+	+	-	-	
28	30	20	H	H	-	-	+	2	1	1	2	1.50	2	1	2	2	1.75	-	2	-	2	2	2	3	3	4	-	-	-	+	-	+	-	-	
29	20	10	H	H	-	-	+	-	2	1	1	2	1.50	1	0	1	1	.75	-	2	-	3	2	3	3	3	3	+	-	-	-	+	-	-	
30	MI	SS	I	N	G																														
31	10	10	H	H	-	-	+	2	1	1	1	1.25	1	0	1	1	.75	-	1	-	2	3	3	3	3	4	+	-	-	-	-	-	-	-	
32	10	0	A	-	-	+	+	-	1	2	1	2	1.50	1	1	1	1	1.00	1	1	-	3	2	3	4	3	5	+	-	-	-	+	-	-	

GI:1.51 PLI:1.13 CALCULUS INDEX:2.67  
 H=Horizontal A=Angular +=yes -=no



NAME: Langley, Angela SSN: 242-06-5056  
 RACE: Black SEX: Female PLACE OF ENLISTMENT: New York AGE: 20

TOOTH PERCENT	BONE		LOSS		BLISS		FURCATION		CARRY		CALCULUS		G		PLY		CALCULUS		MOBILITY		PROBING		FACIAL		PROBING		LINGUAL		BLEEDING		LINGUAL		OCTURSAE	
	MID	MID															FIL																	
1	10	-	H	-	-	-	-	-	2	1	0	2	1.25	1	1	1	1	1.00	-	-	-	3	2	2	4	3	3	+	-	-	+	-	-	
2	10	0	H	-	-	-	-	-	2	0	1	2	1.25	1	1	1	1	1.00	-	-	-	6	2	4	7	2	5	+	-	-	+	-	-	
3	30	30	H	H	-	-	-	-	2	0	1	2	1.25	0	0	0	0	0	-	-	-	4	1	3	5	2	5	+	-	-	+	-	-	
4	10	0	A	-	-	-	-	-	2	0	1	2	1.25	1	0	0	1	.50	-	-	-	3	2	4	3	2	4	-	-	-	+	-	-	
5	0	0	-	-	-	-	-	-	1	0	0	2	.75	1	0	0	1	.50	-	-	-	3	2	3	2	1	3	-	-	-	-	-	+	
6	0	0	-	-	-	-	-	-	2	0	0	0	.50	0	0	0	0	0	-	-	-	3	1	2	3	1	3	+	-	-	+	-	-	
7	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	-	-	-	2	1	3	3	2	3	-	-	-	-	-	-	
8	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	-	-	-	2	1	2	2	2	3	-	-	-	-	-	-	
9	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	-	-	-	2	1	2	3	1	2	-	-	-	-	-	-	
10	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	-	-	-	2	1	2	3	1	2	-	-	-	-	-	-	
11	0	0	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	-	-	-	3	1	3	3	2	3	-	-	-	-	-	-	
12	0	0	-	-	-	-	-	-	1	0	2	2	1.25	1	0	1	1	.75	-	-	-	2	2	3	3	2	3	-	-	-	+	-	-	
13	0	0	-	-	-	-	-	-	1	0	1	2	1.00	1	0	1	1	.75	-	-	-	4	2	3	3	1	3	-	-	-	-	-	+	
14	0	0	-	-	-	-	-	-	2	0	1	2	1.25	1	0	1	1	.75	-	-	-	4	2	3	3	2	3	+	-	-	-	-	+	
15	0	0	-	-	-	-	-	-	1	0	1	2	1.00	1	1	1	1	1.00	-	-	-	3	2	3	3	2	3	-	-	-	-	-	+	
16	0	0	-	-	-	-	-	-	1	0	1	1	.75	1	1	1	1	1.00	-	-	-	3	2	3	5	3	3	-	-	-	-	-	-	
17	0	-	-	-	-	-	-	-	2	1	1	1	1.25	1	1	1	1	1.00	-	-	-	3	3	3	5	2	3	+	-	-	-	-	-	
18	0	0	-	-	-	-	-	-	2	1	1	2	1.50	1	0	1	1	.75	-	-	-	5	2	3	5	3	5	+	-	-	+	-	+	
19	0	0	-	-	-	-	-	-	2	1	1	1	1.25	1	0	0	1	.50	-	-	-	3	2	5	4	3	5	+	-	-	+	-	-	
20	0	0	-	-	-	-	-	-	1	0	0	1	.50	0	0	0	0	0	-	-	-	3	2	3	2	2	3	-	-	-	-	-	-	
21	0	0	-	-	-	-	-	-	1	1	0	1	.75	0	0	0	0	0	-	-	-	3	2	3	3	2	2	-	-	-	-	-	-	
22	0	0	-	-	-	-	-	-	2	0	0	2	1.00	0	0	0	0	0	-	-	-	2	1	2	3	1	3	-	-	-	+	-	+	
23	0	0	-	-	-	-	-	-	2	0	1	2	1.25	0	0	0	0	0	-	1	-	2	1	2	3	1	2	+	-	-	+	-	+	
24	0	0	-	-	-	-	-	-	2	1	1	2	1.50	1	0	0	0	.25	-	1	-	3	1	2	3	1	3	+	-	-	+	-	+	
25	0	0	-	-	-	-	-	-	2	0	1	2	1.25	1	0	0	0	.25	-	-	-	3	1	3	2	1	2	-	-	-	+	-	+	
26	0	0	-	-	-	-	-	-	2	0	1	2	1.25	0	0	0	0	0	-	-	-	3	1	3	2	1	2	-	-	-	+	-	+	
27	0	0	-	-	-	-	-	-	1	0	0	2	.75	1	0	1	1	.75	-	-	-	3	1	3	2	2	3	-	-	+	-	-	-	
28	0	0	-	-	-	-	-	-	2	0	1	2	1.25	0	0	0	0	0	-	-	-	3	1	3	3	2	6	-	-	-	+	-	+	
29	20	10	A	H	-	-	-	+	2	0	1	2	1.25	0	0	0	1	.25	-	-	-	5	2	4	7	3	5	+	-	+	+	-	+	
30	30	20	H	H	-	-	-	-	2	0	1	2	1.25	0	1	0	0	.75	-	-	-	4	2	7	6	2	7	-	-	+	+	-	+	
31	10	0	H	-	-	-	-	-	1	0	1	2	1.00	1	0	1	1	.75	-	-	-	3	3	7	5	3	5	-	-	-	-	-	+	
32	0	-	-	-	-	-	-	-	2	1	1	1	1.25	1	1	1	1	1.00	-	-	-	6	3	3	5	5	5	+	-	-	-	-	-	

GI: .93 PLI: .42 CALCULUS INDEX: .17  
 H=Horizontal A=Angular +=yes -=no

NAME: Lunderman, Keenan, H. SSN: 302-64-4691  
 RACE: Black SEX: Male PLACE OF ENLISTMENT: Ohio AGE: 23

TOOTH PERCENT	LOSSES		TBL YOUNG ONES	FUR CATIONS	CARRIES	CALCULUS	G				PLI				INDEX CALCULUS	MOBILITY	PROBING	FACIAL PROBING	DEPT H	LINGUAL PROBING	FACIAL BLEEDING	LINGUAL BLEEDING	OCT UR S F A L R											
	MID	MID					MID	MID	FIL	LID	T	MID	FIL	LID										T	FIL									
1	MI	SS	I	N	G																													
2	30	0	A	-	-	-	2	0	0	2	1.0	1	0	1	1	.75	-	-	5	2	2	5	4	5	+	-	-	-	-	+	-			
3	50	20	A	H	+	+	-	2	2	0	1	1.25	1	0	0	1	.50	-	-	7	3	6	8	5	7	+	+	-	+	-	-			
4	30	30	A	H	-	-	-	2	0	0	2	1.0	0	0	0	0	0	-	-	7	2	7	7	3	9	+	-	+	+	-	+	-		
5	20	10	H	H	-	-	-	2	0	0	2	1.0	0	0	0	0	0	-	-	4	2	4	7	5	5	+	-	+	+	-	+	-		
6	40	30	A	H	-	-	-	2	2	1	2	1.75	0	0	0	0	0	-	-	I	10	7	5	10	8	7	+	+	+	-	+	-		
7	40	30	A	H	-	-	-	2	0	1	2	1.25	0	0	0	0	0	-	-	I	5	2	8	6	5	5	-	-	+	+	-	-		
8	40	60	H	H	-	-	-	2	0	1	1	1.0	0	0	0	0	0	-	-	I	7	7	10	5	5	10	+	-	-	+	-	-		
9	50	30	H	H	-	-	-	2	0	2	2	1.50	0	0	1	0	.25	-	-	II	7	7	7	10	7	8	+	-	-	-	-	-		
10	50	30	H	H	-	-	-	2	0	2	2	1.50	0	0	0	2	.50	-	-	I	10	2	7	10	8	5	+	-	+	-	-	-		
11	30	20	H	A	-	-	-	2	0	2	2	1.50	2	0	0	0	.50	-	-	-	10	2	5	10	7	5	+	-	+	-	+	-		
12	30	0	-	A	-	-	-	2	0	2	2	1.50	0	0	0	0	0	-	-	I	8	2	4	8	3	5	+	-	+	+	+	+	-	
13	10	20	H	H	-	-	-	2	0	0	1	.75	0	0	0	0	0	-	-	-	4	2	3	4	3	5	+	-	-	-	-	-		
14	40	10	H	A	+	+	-	1	1	1	2	1.25	0	0	0	0	0	-	-	-	4	2	5	7	3	5	-	-	+	-	-	+	-	
15	20	20	A	A	-	-	-	1	2	0	2	1.25	1	0	1	1	.75	-	-	-	4	2	5	5	5	7	-	+	-	-	-	+	-	
16	MI	SS	I	N	G																													
17	MI	SS	I	N	G																													
18	10	20	H	A	-	+	-	-	2	2	2	2	2.0	1	0	0	1	.50	-	-	-	5	3	7	8	5	9	+	+	+	+	+	-	-
19	30	30	H	A	+	+	-	-	2	0	2	2	1.50	1	0	1	1	.75	-	-	I	8	2	5	8	8	8	+	-	+	+	+	+	-
20	20	20	A	H	-	-	-	2	0	2	2	1.50	0	0	0	0	0	-	-	-	9	2	8	9	6	6	+	-	-	+	+	+	-	
21	30	10	H	H	-	-	-	2	0	2	2	1.50	0	0	0	0	0	-	-	-	9	2	5	8	7	3	+	-	+	+	+	+	-	
22	40	30	H	H	-	-	-	2	2	2	2	2.00	0	0	0	0	0	-	1	I	7	7	10	8	8	10	+	+	+	+	+	+	-	
23	80	50	H	H	-	-	-	2	0	2	2	1.50	1	0	1	1	.75	1	1	II	10	4	3	10	9	5	-	-	-	+	-	+	-	
24	40	80	H	H	-	-	-	2	0	2	2	1.50	1	0	1	1	.75	1	1	II	4	7	10	7	3	10	+	-	+	+	+	+	-	
25	40	50	H	H	-	-	-	2	1	1	2	1.50	1	0	1	1	.75	1	1	I	4	4	10	5	8	10	-	-	-	+	-	+	-	
26	50	40	H	H	-	-	-	1	2	1	2	1.50	1	0	1	1	.75	1	1	I	4	4	10	4	2	8	-	+	+	-	-	+	-	
27	30	20	H	H	-	-	-	2	2	0	2	1.50	1	0	1	1	.75	-	1	-	8	7	8	5	2	5	+	+	+	-	-	-	-	
28	20	50	H	A	-	-	-	1	0	2	1	1.25	1	0	1	1	.75	-	-	-	8	2	10	3	5	9	-	-	-	-	+	-	-	
29	10	30	H	H	-	-	-	1	0	2	1	1.25	1	0	1	1	.75	-	-	I	4	2	7	7	5	7	-	-	-	-	+	-	-	
30	40	30	H	H	+	+	-	-	2	2	1	2	1.75	0	0	0	0	0	-	-	I	7	2	8	5	6	7	+	+	+	-	-	+	-
31	20	20	H	A	-	+	-	-	2	0	0	2	1.00	1	1	1	1.00	-	-	I	4	5	6	7	7	7	+	-	+	+	-	+	-	
32	MI	SS	I	N	G																													

GI:1.44 PLI:.38 CALCULUS INDEX: .33  
 H=Horizontal A=Angular +=yes -=no



NAME: Mays, Lucy  
 RACE: Black

SEX: Female SSN: 253-11-8154  
 PLACE OF ENLISTMENT: Georgia

AGE: 24

T I D E N T	P E R C E N T	B O N E S	L O S S	T B L Y O O P M S E E S	F U R C A T I O N	C A R I E S	C A L C U L U S	6 I	P L I	C A L C U L U S	I N D E X	M O B I L I T Y	P R O B I N G	F A C I A L	P R O B I N G	L I N G U A L	F A C I A L	L I N G U A L	O C C U R R E N C E												
																				M	D	M	D	M	F	L	D	T	M	F	L
1	0	0	-	-	-	-	2	0	2	2	1.50	1	1	1	1	1.00	-	-	3	2	2	3	4	3	+	-	+	-	+	-	
2	0	0	-	-	-	-	2	1	0	2	1.25	1	1	1	1	1.00	-	-	3	2	4	3	3	2	-	-	+	-	+	-	
3	40	0	A	-	-	-	2	1	0	2	1.25	1	0	1	1	.75	-	-	7	2	3	8	2	2	-	-	+	-	+	-	
4	0	0	-	-	-	-	1	0	0	1	.50	1	0	1	1	.75	-	-	3	2	2	3	2	2	-	-	-	-	-	-	
5	M	S	S	I	N	G																									
6	0	-	-	-	-	-	2	0	0	1	.75	1	0	1	1	.75	-	-	4	2	2	3	3	3	-	-	+	-	-	-	
7	0	10	-	H	-	-	1	1	0	2	1.00	1	1	1	1	1.00	-	-	3	2	3	2	2	3	-	-	+	-	+	-	
8	0	0	-	-	-	-	1	1	1	1	1.00	1	0	1	2	1.00	-	-	3	2	3	2	2	2	-	-	-	-	-	-	
9	0	0	-	-	-	-	1	1	1	1	1.00	1	0	1	1	.75	-	-	3	2	3	2	2	3	-	-	-	-	-	-	
10	0	0	-	-	-	-	2	1	1	1	1.25	1	0	1	1	.75	-	-	3	2	3	3	2	2	-	-	+	-	-	-	
11	0	0	-	-	-	-	1	0	0	1	.50	1	0	0	1	.50	-	-	3	2	3	3	2	2	-	-	-	-	-	-	
12	M	S	S	I	N	G																									
13	0	0	-	-	-	-	1	0	0	1	.50	1	0	0	1	.50	-	-	4	2	3	3	2	3	-	-	-	-	-	-	
14	50	0	A	-	-	-	2	1	2	2	1.75	1	1	1	1	1.00	1	-	10	2	4	10	2	3	-	-	+	+	+	+	
15	0	0	-	-	-	-	2	2	2	2	2.00	2	2	0	2	1.50	-	-	4	3	5	3	2	4	+	+	+	+	+	+	
16	0	0	-	-	-	-	2	2	2	2	2.00	1	2	1	1	1.25	-	-	5	3	4	4	3	3	+	+	+	+	+	+	
17	0	-	-	-	-	-	2	1	1	2	1.50	2	1	2	2	1.75	-	-	3	3	3	5	2	4	+	+	+	+	+	+	
18	0	10	-	H	-	-	2	1	1	2	1.50	1	1	1	1	1.00	-	-	4	2	3	4	2	5	+	+	+	+	+	+	
19	0	0	-	-	-	-	2	1	0	2	1.25	1	1	1	1	1.00	-	-	5	2	3	3	2	4	+	+	+	+	+	+	
20	0	0	-	-	-	-	2	0	1	2	1.25	1	0	1	1	.75	-	-	3	2	3	3	2	4	+	+	+	-	+	-	
21	M	S	S	I	N	G																									
22	-	-	-	-	-	-	1	0	2	2	1.25	1	0	1	1	.75	-	1	-	4	2	4	3	2	3	-	-	-	+	-	
23	0	-	-	-	-	-	1	1	1	1	1.00	1	0	1	1	.75	-	1	-	3	1	2	3	2	3	-	-	-	-	-	-
24	30	0	H	-	-	-	2	1	2	2	1.75	2	1	2	2	1.75	1	2	-	3	1	2	3	2	3	-	-	+	+	+	-
25	0	30	-	H	-	-	2	1	2	2	1.75	2	1	2	2	1.75	1	2	-	4	2	4	3	2	3	+	-	-	+	+	+
26	0	10	-	H	-	-	2	0	2	2	1.50	1	0	1	1	.75	-	1	1	4	2	3	3	2	3	-	-	+	+	+	-
27	0	0	-	-	-	-	2	0	2	2	1.50	1	1	1	1	1.00	-	1	-	3	2	3	3	2	3	-	-	+	+	+	+
28	M	S	S	I	N	G																									
29	0	0	-	-	-	-	2	0	2	2	1.50	1	0	1	1	.75	-	-	-	4	1	3	3	2	3	-	-	+	+	+	+
30	40	0	H	-	-	-	2	0	2	2	1.50	1	1	1	1	1.00	-	-	-	4	2	8	3	3	8	-	-	+	+	+	+
31	0	30	-	H	-	-	2	0	1	2	1.25	1	1	1	1	1.00	-	-	-	9	2	4	10	3	5	-	-	+	+	+	-
32	0	0	-	-	-	-	2	1	0	1	1.00	1	1	1	1	1.00	-	-	-	4	2	3	5	4	3	+	-	-	-	-	-

GI: 1.28 PLI: .96 CALCULUS INDEX: .67  
 H=Horizontal A=Angular +=yes -=no

61:1.75 PLI:1.70 CALCULUS INDEX:2.5  
H=Horizontal A=Angular +=yes -=no



NAME: O'Boyle, Daniel  
 RACE: Caucasian SEX: Male

SSN: 191-56-2008  
 PLACE OF ENLISTMENT: Pennsylvania AGE: 23

TIP	B	L	T	F	C	C	G	P	C	M	P	F	P	L	B	F	L	O
OR	D	D	P	U	A	A	I	L	A	O	R	D	D	G	D	D	G	C
CE	S	S	N	R	R	L			L									
NT	S	E	E	A	I	C	6	P	C	M	P	D	D	L	D	D	L	U
	M	D																S
																		A
																		E
																		R
1	20	10	H	H	-	-	+	1	0	0	1	.50	1	1	1	1	1.00	-
2	40	20	H	H	-	-	+	2	1	0	2	1.25	2	1	1	1	1.25	-
3	20	30	H	H	-	-	+	1	0	0	2	.75	2	0	1	2	1.25	-
4	20	20	H	H	-	-	+	2	0	0	2	1.00	2	0	1	2	1.25	-
5	20	10	H	H	-	-	-	2	0	0	2	1.00	2	1	1	2	1.50	-
6	20	10	H	H	-	-	-	2	1	0	2	1.25	1	0	0	1	.50	-
7	20	30	H	H	-	-	-	2	0	0	2	1.00	1	0	0	1	.50	-
8	20	40	H	A	-	-	-	2	0	0	1	.75	1	0	0	1	.50	-
9	20	20	H	H	-	-	-	2	1	1	2	1.50	1	0	0	1	.50	-
10	50	40	A	H	-	-	-	2	1	1	2	1.50	1	0	1	1	.75	-
11	20	10	H	H	-	-	-	2	1	2	2	1.75	1	0	1	1	.75	-
12	20	10	H	H	-	-	+	2	1	1	2	1.50	1	0	0	2	.75	-
13	10	20	H	H	-	-	+	2	0	1	2	1.25	1	1	0	2	1.00	-
14	20	30	H	H	-	-	+	2	0	0	2	1.00	2	1	0	2	1.25	-
15	30	30	H	H	-	-	+	2	1	0	2	1.25	2	2	1	2	1.75	1
16	20	10	H	H	-	-	-	2	0	1	2	1.25	2	2	1	2	1.75	-
17	0	0	-	-	-	-	-	2	1	1	1	1.25	2	1	1	2	1.50	-
18	20	10	H	H	-	-	+	2	0	1	1	1.00	2	1	2	2	1.75	-
19	10	20	H	H	-	-	+	2	0	2	2	1.50	2	1	2	2	1.75	-
20	MI	SS	I	N	6													
21	10	10	H	H	-	-	-	1	0	1	2	1.00	1	0	1	1	.75	-
22	10	10	H	H	-	-	-	1	0	0	1	.50	1	0	0	1	.50	1
23	0	0	-	-	-	-	-	1	0	1	1	.75	1	0	1	1	.75	1
24	10	10	H	H	-	-	-	2	1	2	2	1.75	1	0	1	1	.75	1
25	10	10	H	H	-	-	-	2	0	2	2	1.50	1	1	1	1	1.00	1
26	0	10	-	H	-	-	-	2	0	2	1	1.25	1	0	1	1	.75	1
27	10	-	H	-	-	-	-	1	0	0	1	.50	1	0	1	1	.75	-
28	0	0	-	-	-	-	+	2	0	0	2	1.00	1	0	0	1	.50	-
29	10	10	H	H	-	-	+	2	0	1	2	1.25	1	0	0	2	.75	-
30	10	20	H	H	-	-	+	2	0	0	2	1.00	2	1	1	1	1.25	-
31	10	10	H	H	-	-	+	2	0	1	2	1.25	2	0	1	2	1.25	-
32	0	0	-	-	-	-	-	2	2	2	2	2.00	2	2	2	2	2.00	-

G1:1.16 PLI:1.04 CALCULUS INDEX:.67  
 H=Horizontal A=Angular +=yes -=no





SSN: 013-54-5435  
PLACE OF ENLISTMENT: Massachusetts AGE: 24

GI:2.0 PLI:1.66 CALCULUS INDEX:1.17  
H=Horizontal A=Angular +=yes -=no



**AGE: 20**

GI:1.06 PLI:1.15 CALCULUS INDEX:.5  
H=Horizontal A=Angular +=yes -=no

NAME: Pender, Tina  
RACE: Black

SEX: Female

SSN: 269-66-2356  
PLACE OF ENLISTMENT: Ohio

AGE: 24

T	P	B	L	T	F	C	G	P	C	M	P	F	P	P	L	B	L	O
TOOTH	PERCENT	BLISS	YOUNG	ARRAYS	ARRAYS	ARRAYS	ARRAYS	ARRAYS	ARRAYS	ARRAYS	ARRAYS	ARRAYS	ARRAYS	ARRAYS	ARRAYS	ARRAYS	ARRAYS	ARRAYS
	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
1	-	20	-	H	-	-	-	2	2	1	2	1.75	2	2	1	2	1.75	-
2	10	10	H	H	-	-	-	2	1	0	2	1.25	1	1	0	2	1.00	-
3	20	20	H	H	+	+	+	1	0	1	2	1.00	1	0	0	1	.50	-
4	0	30	-	H	-	-	-	1	0	0	1	.50	1	0	0	1	.50	-
5	0	0	-	H	-	-	-	1	0	0	1	.50	0	0	0	0	0	-
6	0	10	-	H	-	-	-	0	0	0	2	.50	0	0	0	1	.25	-
7	40	10	A	H	-	-	-	2	0	0	0	.50	1	0	1	1	.75	-
8	30	20	H	H	-	-	-	0	0	0	1	.25	1	0	0	1	.50	-
9	20	20	H	H	-	-	-	0	0	0	1	.25	1	0	1	1	.75	-
10	40	30	A	H	-	-	-	1	1	0	1	.75	2	1	1	2	1.50	-
11	10	10	H	H	-	-	-	2	0	0	1	.75	2	1	1	2	1.50	-
12	10	10	H	A	-	-	-	2	0	0	1	.75	1	0	0	1	.50	-
13	0	20	-	H	-	-	-	2	0	0	1	.75	1	0	0	1	.50	-
14	40	50	A	A	+	+	+	1	1	1	1	1.00	1	0	0	1	.50	-
15	10	-	H	-	-	-	-	1	0	1	1	.75	1	0	1	1	.75	-
16	-	-	-	-	-	-	-	1	1	1	1	1.00	2	2	2	2	2.00	-
17	IN	PA	C	T	E	D												
18	0	0	-	-	-	-	-	2	0	1	1	1.00	2	1	1	2	1.50	-
19	10	30	H	A	+	+	+	2	0	1	2	1.25	1	0	1	1	.75	-
20	10	20	H	H	-	-	-	2	0	1	1	1.00	1	0	0	1	.50	-
21	0	10	-	H	-	-	-	1	0	0	2	.75	1	0	0	1	.50	-
22	0	10	-	H	-	-	-	1	0	0	1	.50	2	1	0	2	1.25	-
23	0	10	-	H	-	-	-	1	0	1	1	.75	1	1	0	2	1.00	-
24	0	10	-	H	-	-	-	1	1	1	1	1.00	1	2	0	1	1.00	-
25	0	0	-	-	-	-	-	1	1	1	1	1.00	1	2	1	1	1.25	-
26	0	10	-	H	-	-	-	1	0	1	2	1.00	1	1	1	1	1.00	-
27	0	10	-	H	-	-	-	2	0	1	1	1.00	1	1	1	1	1.00	-
28	0	0	-	-	-	-	-	1	0	0	1	.50	2	0	1	1	1.00	-
29	0	20	-	H	-	-	-	2	1	0	2	1.25	1	0	1	1	.75	-
30	40	40	A	A	+	+	+	2	1	2	2	1.75	2	0	1	2	1.25	-
31	10	0	H	-	-	-	-	2	1	2	2	1.75	2	1	1	2	1.50	-
32	IN	PA	C	T	E	D												

G1:.09 PL1:.92 CALCULUS INDEX:1.17  
H=Horizontal A=Angular +=yes -=no

NAME: Picard, Sandra SSN: 007-70-9132  
RACE: Caucasian SEX: Female PLACE OF ENLISTMENT: Maine AGE: 21

T O O T H	I M P R E S S I O N	B O N E	L O S S	T R I C U L O S S	F U R C A T I O N	C I R C U L A R	C A L C U L U S	G				P				C A L C U L U S	I N D E X	M O B I L I T Y	P R O T H	F A C I A L	D E P T H	L I N G U A L	B L E E D I N G	F A C I A L	B L E E D I N G	L I N G U A L	I N C Y C L E U R S E A R								
								M	F	L	D	T	M	F	L													D	T	F	L	D	T	M	F
1	IM	PA	CT	ED																															
2	30	-	H	-	+	-	-	2	1	1	2	1.50	2	1	2	2	1.75	-	-	-	5	2	2	4	3	3	+	-	+	-	+	-			
3	60	50	A	A	+	+	-	-	2	2	0	2	1.50	2	2	1	2	1.75	-	-	-	4	2	5	7	2	5	+	-	+	-	+	-		
4	0	10	-	H	-	+	-	-	2	1	0	2	1.25	2	1	0	2	1.25	-	-	-	3	2	5	3	2	5	+	-	+	+	-	+	-	
5	0	0	-	-	-	+	-	-	2	1	0	2	1.25	2	1	1	2	1.50	-	-	-	4	2	2	3	3	3	+	-	+	+	-	+	-	
6	-	0	-	-	-	-	-	-	2	1	1	2	1.50	2	2	1	2	1.75	-	-	-	3	2	4	3	2	3	+	-	+	+	-	+	-	
7	10	10	H	H	-	-	-	-	2	1	1	2	1.50	2	2	1	2	1.75	-	-	-	3	2	3	3	3	3	+	-	+	+	-	+	-	
8	10	10	H	H	-	-	-	-	2	1	1	2	1.50	2	2	1	2	1.75	-	-	-	2	3	3	3	3	3	+	-	+	+	-	+	-	
9	10	0	H	-	-	-	-	-	2	1	1	2	1.50	2	2	1	2	1.75	-	-	-	2	3	3	3	2	2	+	-	+	+	-	+	-	
10	10	0	H	-	-	-	-	-	2	1	1	2	1.50	2	2	2	2	2.00	-	-	-	3	3	3	3	3	2	+	-	+	+	-	+	-	
11	0	0	-	-	-	-	-	-	2	1	1	2	1.50	2	2	1	2	1.75	-	-	-	3	2	3	3	2	3	+	-	+	+	-	+	-	
12	0	0	-	-	-	+	-	-	2	1	0	2	1.25	2	2	1	2	1.75	-	-	-	5	2	3	3	2	4	+	-	+	+	-	+	-	
13	0	0	-	-	-	+	-	-	2	1	0	2	1.25	2	2	1	2	1.75	-	-	-	5	3	3	4	2	4	+	-	+	+	-	+	-	
14	0	0	-	A	-	+	+	-	2	1	0	2	1.25	2	2	1	2	1.75	-	-	-	3	2	5	3	3	4	+	-	+	+	-	+	-	
15	0	0	-	-	-	+	-	-	2	1	0	2	1.25	2	2	1	2	1.75	-	-	-	5	3	3	4	3	3	+	-	-	-	-	-	-	
16	IM	PA	CT	ED																															
17	IM	PA	CT	ED																															
18	0	0	-	-	-	+	+	-	2	0	2	2	1.50	2	2	2	2	2.00	-	-	-	3	2	3	3	3	3	-	-	-	-	-	-	-	-
19	0	0	-	-	-	+	+	-	2	1	2	2	1.75	2	2	2	2	2.00	-	-	-	3	2	3	4	3	4	+	-	-	+	-	-	-	-
20	0	0	-	-	-	+	+	-	2	0	1	2	1.25	2	2	2	2	2.00	-	-	-	3	2	3	3	3	4	-	-	-	+	-	-	-	-
21	0	0	-	-	-	+	-	-	2	1	1	2	1.50	2	2	2	2	2.00	-	-	-	2	2	2	2	2	3	-	-	-	-	-	-	-	-
22	0	0	-	-	-	-	-	-	2	1	1	2	1.50	2	2	1	2	1.75	-	-	-	4	2	3	2	1	2	+	-	-	+	-	+	-	-
23	0	0	-	-	-	-	-	-	2	2	2	2	2.00	2	2	1	2	1.75	1	-	-	4	3	3	3	2	3	+	-	+	+	-	+	-	-
24	0	0	-	-	-	-	-	-	2	1	2	2	1.75	2	2	1	2	1.75	-	-	-	3	2	3	3	2	3	+	-	+	+	-	+	-	-
25	0	0	-	-	-	-	-	-	2	1	1	2	1.50	2	2	1	2	1.75	-	-	-	3	2	3	2	3	3	+	-	+	+	-	+	-	-
26	0	0	-	-	-	-	-	-	2	1	2	2	1.75	2	2	1	2	1.75	1	-	-	3	3	3	3	2	3	+	-	+	+	-	+	-	-
27	0	0	-	-	-	-	-	-	2	1	1	2	1.50	2	2	1	2	1.75	1	-	-	3	3	3	3	2	2	-	-	-	+	-	+	-	-
28	0	0	-	-	-	+	-	-	2	1	1	2	1.50	2	2	1	2	1.75	-	-	-	3	1	3	2	2	3	-	-	-	+	-	-	-	-
29	0	0	-	-	-	+	-	-	2	0	1	2	1.25	2	2	1	2	1.75	-	-	-	3	1	3	3	2	3	+	-	-	+	-	+	-	-
30	0	50	-	A	+	+	-	-	2	0	2	2	1.50	2	1	2	2	1.75	-	1	-	3	5	9	3	2	5	-	-	+	+	-	+	-	-
31	0	-	-	-	-	+	-	-	2	1	2	2	1.75	2	2	2	2	2.00	-	1	-	4	2	3	3	3	3	+	-	-	+	-	-	-	-
32	IM	PA	CT	ED																															

GI:1.5 PLI:1.78 CALCULUS INDEX:.33  
H=Horizontal A=Angular +=yes -=no











NAME: Sinclair, Deborah SSN: 226-96-9280 AGE: 26  
 RACE: Black SEX: Female PLACE OF ENLISTMENT: Virginia

TIP OFF H	B O N E S	L O S S	T B L Y O O P N S E S	F U R C A T I O N	C I R C U L A R I E S	C A L C U L U S	G I	P L I	C I N D E X	M O B I L I T Y	P R O B I N G	F A C I A L	P R O B I N G	L I N G U A L	B L E E D I N G	L I N G U A L	D I C T I O N A R Y
MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID
1	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	30	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	30	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	30	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	40	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	10	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	30	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	30	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	30	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

GI: .95 PLI: 1.09 CALCULUS INDEX: .5  
 H=Horizontal A=Angular +yes --no

NAME: Sonn, Byron  
RACE: Black

SEX: Male

SSN: 434-19-6626  
PLACE OF ENLISTMENT: Louisiana

AGE: 20

TOOTH	PERCENT	BLISS	TBL	YOUNG	FUR	CARR	XRAY	CALCULUS	6	PLI	CALCULUS	INDEX	MOBILITY	PROBING	FACIAL	PROBING	LINGUAL	FACIAL	BLEEDING	LINGUAL	DI	CN	CE	UR	SF	AE	LR							
1	IMPACTED																																	
2	0	-	-	-	-	-	-	2	1	0	2	1.25	2	2	1	2	1.75	1	-	-	3	2	2	3	2	3	+	-	+	-	-	-	-	-
3	10	10	A	H	-	-	+	-	2	1	1	2	1.50	2	2	1	2	1.75	1	-	-	4	2	3	4	2	4	+	-	+	-	-	+	+
4	0	0	-	-	-	-	+	-	2	1	1	2	1.50	2	1	1	2	1.50	-	-	-	4	2	4	3	2	3	-	-	-	+	-	+	-
5	40	10	A	H	-	-	+	1	0	0	1	.50	2	0	1	1	1.00	-	-	-	7	2	3	3	2	3	-	-	-	-	-	-	-	-
6	0	10	-	H	-	-	-	-	1	0	1	1	.75	2	0	1	1	1.00	-	-	-	3	2	3	3	2	3	-	-	-	-	-	-	-
7	20	10	H	H	-	-	+	-	2	0	1	2	1.25	2	0	1	2	1.25	-	-	-	4	2	3	3	2	3	-	-	-	+	-	+	-
8	30	20	H	H	-	-	+	-	1	0	0	2	.75	2	0	1	2	1.25	1	-	-	4	3	4	5	3	4	-	-	-	-	+	-	-
9	30	30	H	H	-	-	+	2	0	1	2	1.25	2	0	1	2	1.25	1	-	-	4	2	4	5	3	3	+	-	-	-	+	-	+	-
10	10	10	H	H	-	-	+	1	0	1	1	.75	2	0	1	2	1.25	1	-	-	4	2	3	3	2	4	-	-	-	-	-	-	-	-
11	0	0	-	-	-	-	-	-	2	0	0	1	.75	2	0	1	2	1.25	-	-	-	3	2	5	3	2	4	+	-	-	-	-	-	-
12	10	20	H	A	-	-	+	1	0	0	1	.50	1	0	1	1	.75	-	-	-	5	2	6	4	2	5	-	-	-	-	-	-	-	-
13	10	0	A	-	-	-	+	-	1	1	0	1	.75	1	2	1	2	1.50	2	-	-	6	2	4	2	2	5	-	-	-	-	-	-	-
14	30	-	A	-	-	-	+	-	2	1	1	2	1.50	2	2	1	2	1.75	1	-	-	5	2	4	5	2	5	+	-	+	+	-	+	-
15	0	-	-	-	-	-	+	-	2	1	0	2	1.25	2	2	1	2	1.75	1	-	-	5	3	3	5	3	3	+	-	+	+	-	-	-
16	IMPACTED																																	
17	IMPACTED																																	
18	0	-	-	-	-	-	+	-	2	0	1	1	1.00	2	1	2	2	1.75	-	-	-	3	2	5	5	3	4	+	-	-	-	-	-	-
19	0	20	-	A	-	-	+	2	0	1	2	1.25	2	1	2	2	1.75	-	-	-	3	2	4	5	3	5	+	-	+	-	-	+	-	-
20	0	0	-	-	-	-	+	1	0	1	2	1.00	2	0	2	2	1.50	-	1	-	3	2	4	4	3	5	-	-	+	-	-	-	-	-
21	0	0	-	-	-	-	+	1	0	1	2	1.00	2	0	2	2	1.50	-	1	-	3	2	3	3	3	5	-	-	+	-	-	-	-	-
22	0	0	-	-	-	-	+	1	0	1	2	1.00	2	1	1	2	1.50	-	1	-	3	2	3	2	2	3	-	-	+	-	-	-	-	-
23	10	10	H	H	-	-	+	1	1	1	1	1.00	2	2	2	2	2.00	1	2	-	3	2	3	2	2	2	-	-	-	-	-	-	-	-
24	20	10	H	H	-	-	+	1	0	1	1	.75	2	1	2	2	1.75	1	3	-	3	2	3	3	2	2	-	-	-	-	-	-	-	-
25	10	20	H	H	-	-	+	1	0	1	1	.75	2	1	2	2	1.75	1	3	-	3	2	3	3	2	2	-	-	-	-	-	-	-	-
26	30	30	A	A	-	-	+	1	0	1	1	.75	2	1	2	2	1.75	1	3	-	3	2	3	2	2	3	-	-	-	-	-	-	-	-
27	0	0	-	-	-	-	+	1	0	1	1	.75	2	1	2	2	1.75	-	1	-	3	1	2	2	2	3	-	-	-	-	-	-	-	-
28	0	0	-	-	-	-	+	1	0	1	1	.75	1	1	1	1	1.00	-	-	-	3	2	3	3	3	3	-	-	-	-	-	-	-	-
29	0	0	-	-	-	-	+	1	0	1	1	.75	2	0	2	2	1.50	-	1	-	4	2	3	3	2	5	-	-	-	-	-	-	-	-
30	0	20	-	A	-	-	+	2	0	1	1	1.00	2	1	2	2	1.75	-	-	-	3	2	5	5	3	7	+	-	-	+	-	-	-	-
31	10	-	H	-	-	-	+	-	1	0	2	2	1.25	2	1	2	2	1.75	-	-	-	4	2	5	3	3	5	-	-	-	+	+	-	+
32	IMPACTED																																	

GI: .93 PLI: 1.5 CALCULUS INDEX: 1.67  
H=Horizontal A=Angular +=yes -=no







NAME: Taulbee, Sally SSN: 400-13-5714  
 RACE: Caucasian SEX: Female PLACE OF ENLISTMENT: Kentucky AGE: 19

TIP OFFICE MENT	B O N E	L I T E R A T U R E	T E C H N I C A L	F I G U R E S	C I V I L	C A L C U L U S	6 I	P L I	C A L C U L U S	I N D E X	M O B I L I T Y	P R O T H I N G	F A C I A L	P R O T H I N G	L I N G U A L	B L E E D I N G	F A C I A L	B L E E D I N G	O I C N T L E U R S F A E L R
M/D	M/D																		
1	IM	PA	CT	ED															
2	50	0	A	-	-	-	2	0	0	1	.75	1	1	0	1	.75	-	-	-
3	0	40	-	H	+	+	-	2	0	0	2	1.00	1	1	0	1	.75	1	-
4	0	0	-	-	-	-	1	0	0	1	.50	1	0	0	1	.50	-	-	-
5	20	0	A	-	-	-	1	0	0	2	.75	1	0	0	1	.50	-	-	-
6	20	20	H	H	-	-	1	0	1	1	.75	1	0	0	1	.50	-	-	-
7	40	30	H	H	-	+	-	2	1	1	2	1.50	1	0	1	1	.75	-	-
8	10	40	A	H	-	-	1	0	0	2	.75	1	0	0	1	.50	1	-	-
9	10	10	H	H	-	-	1	1	0	1	.75	1	0	0	1	.50	-	-	-
10	0	10	-	H	-	+	-	1	1	0	1	.75	1	0	0	1	.50	-	-
11	10	30	H	H	-	-	1	0	0	1	.50	1	0	0	1	.50	-	-	-
12	30	0	H	-	-	+	-	1	0	0	1	.50	1	0	0	1	.50	-	-
13	0	0	-	-	-	-	2	0	0	1	.75	1	0	0	1	.50	-	-	-
14	10	40	H	H	+	+	-	2	0	0	1	.75	1	0	0	1	.50	1	-
15	40	-	H	-	-	+	-	2	0	0	1	.75	1	0	0	1	.50	-	-
16	IM	PA	CT	ED															
17	20	-	H	-	-	+	-	1	0	1	1	1.00	1	1	1	1	1.00	-	-
18	30	40	A	H	+	+	-	2	0	0	2	1.00	1	1	1	1	1.00	-	-
19	MI	SS	I	N	G														
20	0	10	-	H	-	-	2	0	1	1	1	1.00	1	0	1	1	.75	-	-
21	0	0	-	-	-	-	1	0	0	1	.50	1	0	1	1	.75	-	-	-
22	30	0	H	-	-	-	1	0	0	1	.50	1	0	0	1	.50	1	1	-
23	10	20	H	H	-	-	1	0	1	1	.75	1	0	0	1	.50	-	1	-
24	10	10	H	H	-	-	1	0	1	1	.75	1	0	0	1	.50	-	1	-
25	20	10	H	H	-	-	2	1	1	1	1.25	1	1	1	1	1.00	1	1	-
26	10	10	H	H	-	-	1	0	0	1	.50	1	0	1	1	.75	-	1	-
27	10	0	H	-	-	-	1	0	0	1	.50	1	0	0	1	.50	-	1	-
28	0	0	-	-	-	-	2	0	0	1	.75	1	0	0	1	.50	-	-	-
29	0	10	-	H	-	+	-	2	0	0	2	1.00	1	0	1	1	.75	-	-
30	MI	SS	I	N	G														
31	0	0	-	-	-	+	-	2	2	2	2	2.00	1	1	1	1	1.00	-	-
32	10	-	A	-	-	+	-	2	1	0	1	1.00	1	1	1	1	1.00	-	-

GI: .83 PLI: .65 CALCULUS INDEX: .83  
 H=Horizontal A=Angular +=yes --no









NAME: Wright, Michael      SSN: 257-19-4043  
RACE: Black      SEX: Male      PLACE OF ENLISTMENT: Georgia      AGE: 22

[illegible]

GI:1.23 PLI:1.38 CALCULUS INDEX:1.17  
H=Horizontal A=Angular +=yes -=no

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VITA

Robert Bousquet [REDACTED]

PII Redacted

[REDACTED] [REDACTED] enlisted in the Air Force in June 1967. He attended college at Minot State College, Minot, North Dakota; University of West Florida, Pensacola, Florida and Okaloosa Walton Jr. College, Niceville, Florida. He received an Associate of Arts degree in December 1973 from Okaloosa Walton Jr. College. He attended the University of Florida, College of Dentistry, beginning in September 1974, receiving the degree of Doctor of Dental Medicine in December 1977. Following graduation, he was assigned to Travis Air Force Base, Fairfield, California, where he served as a general dentist and shortly thereafter, in June 1978, began a one-year General Dentistry Residency. The residency was completed in June 1979, and he was assigned to Sembach Air Base, Sembach, Germany, where again he served as a general dentist with advanced training. In July 1982, he enrolled in the Basic Science portion of the Periodontic Post-Doctoral Program at the University of Texas Health Science Center at San Antonio (UTHSC-SA), in conjunction with the Wilford Hall United States Air Force Medical Center Graduate Periodontics Residency Program. He was admitted to candidacy for the Master of

Science degree at the UTHSC-SA Graduate School in April 1984. He was married to Sandra L. [REDACTED] on June 21, 1969. They have one daughter, Jennifer Lynn, [REDACTED] [REDACTED] [REDACTED]. His parents, Louis A. Bousquet and Lucille R. Bousquet, currently reside in Wareham, Massachusetts.